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RECENT PROGRESS IN THE PREVENTION AND TREATMENT OF SCARLATINA, MEASLES AND DIPHTHERIA

BY DWIGHT O'HARA, M.D.

THE modern physician seldom tells his patients, as his medical predecessors frequently did, that they are suffering from a "complication of diseases". Whether or not this is a blessing to his patients, the doctor of today is enabled to avoid such a blanket diagnosis only by a more minute knowledge of disease—a knowledge so minute that the doctor himself sometimes becomes threatened with "a complication of ideas". The progress of medicine would be discouraging indeed, if it perpetually led to a more and more confusing mass of detail. But there seems to come a time in the clinical application of scientific facts when an increasing complexity yields to simplicity.

The development of the modern prevention and treatment of diphtheria has made it necessary for the doctor who would practice it to acquire a rather nice knowledge of the subject. Having mastered it he might well be vexed when the progress-loving citizen asks "what next?" It must be with some reassurance that the doctor learns that scarlet fever is likely to be conquered by an analogous method, and that the very latest suggestion to arise from the study of measles also points to the similarity rather than the diversity of the secrets which underlie these three diseases.

It is necessary to tell the story of the recent progress in the prevention and treatment of these diseases in three different parts. Diphtheria, scarlatina and measles is the order in which they should be taken up, for it is in this order that the completeness of our knowledge of them stands at the present time.

DIPHTHERIA

Diphtheria was first named just one hundred years ago by the Frenchman Bretonneau. In the latter part of this even century there stand out certain names and discoveries which are closely associated with one another. The discovery of the bacillus by Klebs; its isolation in pure culture by Loeffler; the discovery of its soluble toxin by Roux and Yersin; the discovery of antitoxin by Behring; the investigation by an army of workers, chief among whom was

perhaps Theobald Smith, of the toxin-antitoxin relationship, passive immunization by antitoxin and the possibilities of active immunization by toxin or toxin-antitoxin mixtures; these are the contributions which were made over the period of thirty years ending in 1913.

At that time we knew that diphtheria antitoxin produced an immunity which cured diphtheria if administered sufficiently early and in sufficient amount, and which temporarily prevented the disease from developing in individuals who had been exposed and were liable to contract it. Antitoxin had already been widely used clinically for these purposes. The clinicians also knew that certain individuals might carry virulent diphtheria bacilli in their throats and not contract the disease. The laboratory workers knew this and more. They knew that the reason why these individuals did not contract the disease, in spite of the fact that they carried the germ and spread the disease to others, was because they had in their blood a certain amount of natural antitoxin which rendered them immune. They knew that the immunity which was conferred on laboratory animals by an injection of antitoxin was temporary. They knew that the injection of toxin or toxin-antitoxin mixtures conferred a lasting immunity on these same animals. They realized the possibility of adapting this method of active immunization to human beings, but they had no way of telling what individuals were immune and safe, or of gauging the development of the active immunity which they might produce in those individuals who were not immune and therefore liable to contract the disease.

In 1913 Schick announced a simple means of testing human beings to determine whether or not they had an antitoxic immunity to diphtheria. Schick stated that 1/30th unit of antitoxin per c.c. of blood serum is enough to protect the individual against diphtheria, and applied the intracutaneous neutralization test to human beings in order to demonstrate the presence or absence of this amount of antitoxin. The Schick test consists in the intradermal injection into the flexor surface of the forearm of 1/50th

of the minimum lethal dose of diphtheria toxin for a 250 Gm. guinea pig. The presence of the amount of antitoxin conferring immunity (1/30th unit per c.c.), in the person tested results in the neutralization of the test toxin; no reaction occurs and the test is said to be negative. Less than 1/30th unit of antitoxin per c.c. of blood serum will not neutralize the test toxin, which becomes fixed in the skin tissue where it is injected and produces a local reaction which is interpreted at the end of four or five days as a positive test. The positive test is usually characteristic and is now familiar to the profession and to a large number of the laity. It indicates the presence of less antitoxin than the amount stated by Schick to be necessary for immunity to the disease, and therefore means that the individual is susceptible to diphtheria.

With the aid of Schick's test for immunity, the study of active immunization with toxin-antitoxin mixtures was begun on a large scale. Foremost in this study was Dr. William H. Park of New York. The results obtained may be summarized as follows. (Quotations are from an article by Park in the *Journal of the American Medical Association* for November 4, 1922.)

"All reports show that under similar conditions the highest percentage of persons having antitoxin occurs among infants passively carrying their mothers' antitoxin, and among adults; between these ages there is first a decrease and then an increase." This corresponds to the well known diphtheria incidence rates. "The knowledge that about 80% of the children who possess no diphtheria antitoxin develop it after three injections of toxin-antitoxin, and with very few exceptions retain it for at least six (now ten) years, and that those who partially fail to respond do respond after a second series of treatments, affords us ground for the belief that we have a practical means of immunizing the child population of the country." The immunity must of course be determined by a Schick test about six months after the injections. The profession must constantly be on guard against the assumption that the injections themselves constitute a guarantee as to the establishment of the immunity. "The evidence that antitoxin is the only substance in the body that can prevent the toxin from acting is so conclusive that we can assume that a negative Schick test means the presence of sufficient antitoxin to neutralize it."

It must be remembered that a careless performance of the Schick test is worse than none at all. The proper technique always includes the following points. The toxin must be used before the expiration date for the particular lot which it represents. This date is marked on the package. The toxin must have been kept on the ice. The toxin must be accurately diluted. It must be used within a few hours of its dilution. The required amount of the di-

lution must be injected *intradermally*. The heated toxin control should be similarly injected at the same time, and the test must not be finally read before the fourth or fifth day. Insistence upon these points may seem superfluous, but it cannot be too often repeated. Otherwise a creditable preventive method will become discredited in the eyes of many people. The method will be indicted, and rightly so, when the technique is faulty.

During the past five years literally hundreds of papers have appeared on the subject of diphtheria prevention. An overwhelming majority of the authors endorse the method, and it would seem that its efficacy has stood the test of time—a test which has failed to confirm many similar promising announcements in the past. There have been reported a few instances in which diphtheria occurred in Schick-negative individuals. Such occurrences may have been due to infection with an ultravirulent strain of diphtheria bacilli, but in at least one of them there was strong evidence that the Schick test was not properly done. This was in a girl, aged ten, who was one of 10 negative reactors in a group of 11 children of the same age. This group had not been immunized and it would be expected to show 60 to 70 per cent of positive reactions, instead of less than 10 per cent. It would indeed be surprising if no technical errors had crept into the execution of the Schick test at some time in every large clinic in which it has been used. The method cannot be philosophically discarded on such rare exceptions as have been reported.

Zingher, whose experience in immunizing schoolchildren has probably been greater than that of any other person, has attempted to simplify the work for the family doctor and the school physician by classifying the immunity findings into age groups. Under six months infants are generally found to be immune, but the immunity cannot be depended upon to last nor can it be readily built up by toxin-antitoxin injections. Soon after six months and up to ten years of age the majority of all children are Schick-positive, and may therefore be given toxin-antitoxin injections without taking the trouble to do a preliminary Schick test. After ten years of age there is an increasing number of children who are immune, and a preliminary Schick test and control test should be made. All positive and positive combined reactors should receive a course of toxin-antitoxin injections. The development of immunity should be checked up by repeating the Schick test six months later. If still positive at that time the toxin-antitoxin injections should be repeated.

It has also been noted that children from the homes of the well-to-do show a much higher percentage of positive Schick reactions than those from the homes of the poorer classes who live in closely crowded neighborhoods. Repeated

exposure to the diphtheria bacillus in the congested districts probably produces mild infections which are not recognized as diphtheria but which lead to the development of immunity. At l'Hôpital des Enfants Malades in Paris it was found that the group of children who presented the largest percentage of negative Schick reactions were not the older children, as might have been expected, but were those who had been in the hospital for the longest time. No positive reaction occurred in a child who had been in the hospital for more than a year. Dudley has made a similar study in an English school of one thousand boys in which there occurred two epidemics of diphtheria. He found not only that antitoxic immunity increased with the length of stay in school, but that the increase in the number of negative Schick tests was markedly accentuated at the times of the two outbreaks of clinical diphtheria. As Dudley states the point, "during an epidemic of diphtheria there is a coincident epidemic of immunization to diphtheria". This is a striking illustration of certain subdivisions of acquired immunity which might be designated as "endemic immunity" and "epidemic immunity". The application of this conception may be well applied to larger fields of Public Health medicine than that of diphtheria alone.

The strength of toxin-antitoxin mixtures has been the subject of much inquiry. Mixtures prepared with 3L+ doses of toxin, balanced with antitoxin, have been supplanted first with 1L+, and later with 1/10 L+ doses. The last named mixture seems to produce immunity in nearly the same percentage as the former preparations. The excess of the toxin over the antitoxin in the mixtures, however, has not been changed. Ordinary storage seems to have only the effect of weakening the toxin in the mixture, rendering it a less potent antigen and therefore a less efficient means of inducing immunity. Mixtures which have run out of date, or have been improperly kept, should be discarded for this reason.

The use of sodium ricinoleate instead of antitoxin to modify toxin for immunizing purposes has recently been announced by Larson and Eder. It is claimed that this method "detoxifies the toxin without altering its antigenic properties". This claim, if substantiated, may bring about the replacement of toxin-antitoxin mixtures by soap-toxin mixtures within the next few years, but the method cannot be appraised at this time.

Kellogg has devised another method of determining whether or not an individual possesses antitoxic immunity to diphtheria by using 1 cc. of the person's serum balanced against a known dose of toxin and injected into a guinea pig. Rather extravagant claims have been made for this method, but its advantages are not those which will appeal to the clinician. Such

indirect methods are not as convenient as, and are subject to more sources of error than the direct method of Schick.

The old bugbear of diphtheria carriers has been attacked by several workers. No real advance in the sterilization of carriers of the diphtheria bacillus has been made, although Moss, Guthrie and others have studied the subject in general. They observed that from 3 to 5 per cent of a large group of children and adults in Baltimore carried the diphtheria bacilli in their upper respiratory passages. Although about 15 per cent of these bacilli were virulent no outbreak of disease could be ascribed to them. It was concluded that avirulent diphtheria bacilli are devoid of pathogenic importance for man, and the subject again resolves itself into one of virulence. Wadsworth's conclusion on this question was that those who had not recently had the disease or come in contact with it were not carriers of virulent bacilli, and that those who had had recent contact or infection with the disease, if they carried the germ at all, carried a virulent form of it. He felt so sure of the latter generalization that he did not consider it worth while to test the virulence of convalescent or contact carriers within the first three months following the onset of the disease.

There have been no outstanding improvements in the treatment of diphtheria in the past ten years. The antitoxin treatment is curative if used sufficiently early, yet the morbidity and mortality rates remain too high. Diphtheria prevention may lower them in time. Earlier diagnosis and prompt treatment would certainly lower the death rate, but it can only follow the education of the public in the matter of having every case of sickness attended with throat or laryngeal symptoms promptly investigated. Weaver, after studying one hundred and forty-seven fatal cases of diphtheria, makes some pertinent suggestions, one of which is the immediate use of antitoxin in all suspicious cases without waiting for positive cultures to justify the diagnosis. If the clinical appearances are suspicious enough to justify the taking of cultures, they are suspicious enough to be treated immediately with antitoxin. Another suggestion is that the distribution of the smaller packages of antitoxin be discontinued, and that 10,000 unit packages be made readily available. The situation can be epitomized in the statement that one should administer antitoxin as early as possible in sufficient quantities. In urgent cases it should be given, with the usual precautions, intravenously. Such rules, faithfully followed, may yet bring about a further reduction in the mortality bills for this disease.

SCARLATINA

The recent dramatic development of our knowledge of scarlet fever is the fruit of forty years of patient investigation—ripening, but

not yet mellow. Dr. A. R. Dochez, in the August 1925 issue of *Medicine*, has well told the story of the etiology of the disease. One cannot read it without realizing how long and tedious has been the process by which we have approached the goal. Sydenham first recognized and named scarlet fever as a clinical entity two hundred and fifty years ago. Crook, Loeffler and Klein isolated and named the *Streptococcus scarlatinae* in 1885. In the early years of the twentieth century Hektoen, Baginsky and Sommerfeld intimately associated the streptococcus with the disease, while Joehmann pointed out the frequent association of the organism with diverse non-scarlatinal conditions. Moser, Grabitchewsky and Savchenko used specific sera and vaccines in spite of certain evidence against their specificity. In the midst of the uncertainty Döhle and Mallory sought evidence in favor of other etiological organisms. Meanwhile, in the light of the researches of such men as Neufeld and Cole, the idea of immunological "types" had dawned on the bacteriologists, and illuminated the field for Dochez, Stevens and Bliss, who cleared the atmosphere by demonstrating the immunological differences which exist among the various pathogenic streptococci.

Streptococcus scarlatinae is the name now given to a group of micro-organisms, serologically distinct and separate from the larger family of *Streptococcus pyogenes*. This group of micro-organisms is distinguished by certain biological properties, among which is the production of a specific toxin. This is a true toxin and there appears in the blood of an animal in which it has been injected an antitoxin which neutralizes it. The toxin is the cause of some of the characteristic signs of the syndrome of scarlet fever, thus making the analogy of scarlet fever to diphtheria a close one. The antitoxin is of value in the treatment of the disease, and the toxin in its prevention. An outline of the development of our knowledge of these facts will cover the ground of the recent progress in the prevention and treatment of scarlet fever.

Although the scarlet fever toxin-antitoxin relationship was shown to exist in an empirical way by Savchenko some fifteen years before, it was not until 1918 that a method of demonstrating it was announced by Schultz and Charlton. They discovered that the injection into the skin of a scarlet fever patient at the height of the rash of 1 c.c. of convalescent serum results in a complete blanching of the rash locally over a diameter of two or more centimeters. In 1923 Mair showed that the serum of a child before an attack of scarlet fever gave a negative Schultz-Charlton reaction, but in convalescence after the attack the reaction became positive. Mair concluded that the scarlet fever rash was due to a specific toxin, and that the Schultz-Charlton extinction phenomenon was

brought about by the local neutralization of toxin with antitoxin. The Schultz-Charlton reaction can, conversely, be used as a test for the presence of scarlet fever antitoxin in the serum.

In 1923 George and Gladys Dick produced scarlet fever in human volunteers by inoculation with a culture of streptococcus obtained from a case of the disease. This experiment was so carefully controlled that it was difficult not to conclude that the streptococcus was the cause of the disease. Indeed, such a conclusion had been reached many times in the two previous decades, but had never before been so convincingly demonstrated. Now, if Mair's interpretation of the Schultz-Charlton reaction was correct, and if the Dicks had actually produced the disease with the streptococcus, then this streptococcus should produce a toxin which would be neutralized by convalescent serum. As a matter of fact the Dicks had already recognized such a toxin in the broth filtrate of their streptococcus cultures, and with it had devised a skin test similar to the Schick test with diphtheria toxin.

For this skin test, now known as the Dick test, an amount of toxin was used which, injected intradermally, produced a red area of from one to two or more centimeters in diameter at the end of twenty-four hours in over 40 per cent of people who had not had scarlet fever. No convalescent scarlet fever patient gave a positive test. Further studies showed that convalescent serum prevented the reaction from developing, both by being mixed with the test toxin and by being administered to the subject before the test was performed. This property of convalescent serum was of course due to its antitoxin content, already hypothetically shown by the Schultz-Charlton reaction.

These facts suggested the development of the same methods for the prevention and treatment of scarlet fever that have been found so efficient for diphtheria. Our present uncertainties in the application of these methods are partly due to the limited time which has elapsed since the discoveries in question were made, and partly to the difficulty which has been experienced in the standardization of scarlet fever toxin and antitoxin. Diphtheria toxin and antitoxin were standardized by Ehrlich and Rosenau on the susceptibility of a two hundred and fifty gram guinea pig to the toxin. There has not yet been found an animal which can be satisfactorily used for such standardization of scarlet fever toxin and antitoxin. Scarlet fever toxin has so far been measured by the amount of toxin which the Dicks found would give a positive skin test in something over 40 per cent of adults who had not had scarlet fever. This amount is called the "skin test dose". The antitoxin is measured according to its ability to neutralize skin test doses of toxin.

The prevention of scarlet fever is now based

on the assumption that a negative Dick test indicates that there is sufficient antitoxin in the subject tested to render him immune to an attack of the disease. This assumption is based upon the fact that about 90 per cent of scarlet fever patients give a positive test before and a negative test in the convalescence from the attack. Those individuals who react negatively to the Dick test are therefore considered to be immune, and such individuals do not seem to contract the disease on exposure. Those who react positively are considered to be not immune, and can be rendered "Dick negative" by inoculations with the toxin. The scarlet fever toxin, being less toxic than that of diphtheria, is not balanced by the addition of antitoxin when used in this way. Dosages which have been employed in active immunization vary from 300 to 40,000 skin test doses, in three or more injections. The optimum dosage has not yet been determined, but when it is finally agreed upon it will probably approach the maximum rather than the minimum figure. The possibility of using a detoxifying agent such as sodium ricinoleate, as recently recommended by Larson and his co-workers, may lead to important modifications of the technique in the near future. One can only regret the avidity and finality of the advertising with which certain preparations of commercial toxin are now offered to the profession. The present status of the question can be summed up in the statement that the theoretical mechanism by which scarlet fever may be prevented is parallel to that of the prevention of diphtheria, but that the ideal technique to be employed has not yet been evolved. Of course scarlet fever antitoxin can be used for the temporary prevention of the disease, but such protection is only a few weeks duration and its use as a prophylactic is not generally desirable.

Turning now to the treatment of scarlet fever with antitoxin, we find that the horse has again proved to be a convenient and valuable friend of man. The injection of increasing doses of toxin has produced horse serum which contains appreciable amounts of antitoxin. The serum produced in this way is called the "Dick Serum," because it is the method developed by the further studies of George and Gladys Dick.

While the Dicks were developing these facts, Dochez was continuing his experiments and in 1923 had produced an antitoxic serum by a peculiar technique of his own. Dochez injected masses of melted nutrient agar subcutaneously into the horse. These masses were then infiltrated with increasing doses of living *Streptococcus scarlatinae*. After nine months the horse was bled and its serum was tested by the Schultz-Charlton reaction for the presence of antitoxin. The amount of antitoxin, as demonstrated by the Schultz-Charlton test, was so abundant that the serum was tried therapeutically by in-

tramuscular injection into a patient with scarlet fever. This work, it should be remembered, was entirely independent of the Dicks' studies. Both the Dick and the Dochez antitoxins are available in the form of purified, concentrated globulins.

We have, then, two distinct antitoxic serums for therapeutic use—the Dick antitoxin and the Dochez antitoxin. The Dick preparation contains antitoxin by virtue of the active immunization of the horse with scarlet fever toxin produced in vitro by cultures of the *Streptococcus scarlatinae*. The Dochez product contains antitoxin, and theoretically also contains certain antibacterial factors produced by the growth of the *Streptococcus scarlatinae* in vivo in the horse. How far the one will replace the other in clinical therapeutics in the future remains to be seen.

All cases of scarlet fever should be given scarlet fever antitoxin. As with all serum treatment which is based on the principle of conferring a passive immunity on the patient, the antitoxin should be administered as early as possible in the course of the disease. After the rash has faded, or for septic complications, serum treatment is of little use. The serum may be administered intramuscularly, or in toxic cases intravenously. When administered by the latter route the usual precautions must be taken against shock. The patient must be tested for sensitiveness to horse serum, and if found to be hypersensitive, must be desensitized by graded injections until the desired amount of serum can be given without untoward reaction. The dose chosen should, like the dose of diphtheria antitoxin, not only be administered as soon as possible after the diagnosis is made, but be of sufficient quantity to make and keep the body fluids antitoxic. When so given the results are very striking. The signs of toxicity disappear within a very few hours, the throat becomes less sore, the rash begins to fade and the pulse and temperature begin to fall. If these effects do not follow within twelve to twenty-four hours the initial dose has been insufficient and should be repeated. The dose which may be expected to be sufficient varies with the severity of the case. The minimum therapeutic dose should be enough antitoxin to neutralize 750,000 skin test doses of toxin. In the *Journal of the American Medical Association* for October 17, 1925, Park has given an excellent resumé of the subject and outline of the treatment. His conclusions must be heartily agreed with by any physician who has had experience with the treatment.

By the recent progress in the prevention and treatment of scarlet fever we have been presented with a means of prevention and with a specific treatment. Dogmatic statements as to the technique of carrying out these measures cannot be made at this time. With the accrual

of more data and experience, dosages may be changed, and perhaps other units of measurement may be found more convenient—"for the rain it raineth every day". But the fundamentals of the progress made are conservative and sound, and the management of scarlet fever has been placed on a scientific basis for the first time by the contributions of the past eight years.

MEASLES

The complaisance with which the laity regards measles doubtless rests upon the fact that its serious sequelae are always in the form of complications which bear other names, such as pneumonia, mastoiditis, and so forth. Measles alone is so common an occurrence in the household or the neighborhood that it hardly inspires interest—much less apprehension. But compound the name into measles-pneumonia and the disease is suddenly taken more seriously, by the physician as well as the family. The frequency with which both the name and the disease are thus compounded, particularly in cantonnments and institutions, would be a proper reason for modifying the naive phrase "only the measles" to that of "the measles only" when it remains uncomplicated. It is curious that a disease which is so common as well as important should not have been made the subject of more experimental investigation. The recent progress in the study of measles has taken two general directions—one toward the study and isolation of the specific virus, and the other toward finding a more empirical means of prevention.

The virus itself has been the subject of some investigation since the discovery by Tunnichoff of a green-producing Gram-negative diplococcus. The Italians have been particularly successful in recovering such an organism from measly sources, and Sindoni describes this virus as filterable. At the present time it can be only mentioned in passing that the virus of measles may eventually prove to have a form conforming to the descriptions of these authors.

That the measles virus is present in the blood just before and during the height of the disease was first demonstrated by Hektoen, who successfully inoculated volunteers by means of ascitic-broth blood cultures. The possibility of the transmission of the disease to monkeys became more and more certain as various experimenters reported their work, until Anderson and Goldberger removed most of the doubt as to the possibility of such transmission by their report in 1911. In 1921 Blake and Trask recorded their carefully controlled experiments, using the Macacus rhesus as their host. They produced a relatively constant syndrome in these monkeys resembling measles in man, by inoculation with naso-pharyngeal washings both before and after filtration through a Berkfield "N" filter, and with citrated whole blood. No difficulty was

experienced in passing the disease through six animals, and no apparent reason, other than the sacrifice of monkeys, prevented them from continuing such animal passages further. The recovery of individual monkeys left them with an immunity to subsequent attempts to re-inoculate them. Since 1921 several workers, among whom may be mentioned Grund and Nevin, and Bittman, claim to have produced a disease in rabbits characterized by lachrymation, exanthem, enanthem and desquamation, which they consider to have been caused by the measles virus. Also Duval and D'aunoy have reported the production in guinea pigs of a disease characterized by pyrexia, leucopenia and hemorrhagic nephritis. They recorded eight animal passages of this disease after the primary inoculation with the measles virus.

This laboratory knowledge of the measles virus confirms its clinical behavior as regards incubation time, period of contagiousness, methods of transmission and production of immunity. The laboratory transmission of the disease by blood transfusion has also been accidentally confirmed in human beings, by the transfusion into a child of 75 c.c. of citrated blood from its mother. Two days after the transfusion the mother came down with the measles, and eleven days later the child also developed the disease in a severe form, from which it died. Besides the confirmation and enlargement of clinical knowledge which these investigations afford, there is suggested in them the promise of future contributions of a more material nature. The "fixing" of the virus, as with that of hydrophobia or its attenuation, as with that of cowpox, by the method of animal-passage now becomes a distinct possibility. The ability to use rabbits and guinea pigs as well as the more expensive monkeys renders this possibility all the greater. A simple method of "vaccination" against measles may soon be evolved from these recent contributions.

The production of an attenuated form of the disease, which will have the same relation to measles that vaccinia has to small-pox, was first sought one hundred and seventy-five years ago, but by methods more crude and less hopeful for success. Seventy-five years ago Mair passed the disease from one child to another by the transference of nasal secretions, but discontinued his experiments when he recognized that the severity of the disease was unaltered by this procedure. In 1921 Hermann reported a similar transference of the disease to infants of four to five months of age—a time of life when the individual has a rapidly decreasing natural immunity. Hermann's little patients had slight reactions, and of twenty-five of them who were subsequently definitely exposed to measles only two contracted the disease. The production of an active immunity by this method would seem to be worthy of more investigation.

Recovery from an attack of measles is accompanied by certain biological changes in the body which render it immune to a second attack. The first attempt to utilize this fact by passively transferring the immunity to a non-immune individual was reported in 1916 by Nicolle and Conseil, who protected the younger children in a family by inoculating them with four c.c. of convalescent serum from an older sibling. In 1920 Degkwitz reported success with this method of passive immunization, using doses of from 7 to 22 c.c. from patients who were from seven to ten days convalescent. He also suggested the use of normal adult serum for the same purpose, inasmuch as most adults have an acquired immunity from measles from an attack of the disease in their childhoods. The use of adult serum, however, except in very large doses, has been disappointing. During the past few years convalescent serum has been utilized for preventive purposes in several clinics; notably in those of Degkwitz, Richardson and O'Connor, McNeal, Noblecourt and Paraf, Jervell, Zingher, and Weaver and Crooks. From the experiences thus reported it may be concluded: 1—That a complete passive immunity to measles can be produced by the injection of 3 to 5 c.c. of convalescent serum, or 5 to 10 c.c. of convalescent whole blood, if given on or before the fifth day following exposure. 2—That this immunity is of less than six months duration. 3—That similar inoculations given after the fifth and before the eighth days following exposure will not prevent the disease but will modify its character.

The advantages of this method of prophylaxis are, the prevention of measles in undernourished children, in whom an attack of the disease often constitutes a serious risk of fatality, and control of institutional epidemics. The limitations of the method are that the immunity conferred, being passive, is of an evanescent nature and that a supply of convalescent serum is not always readily available. No method of prevention which is dependent on a supply of convalescent human serum for its continuation can hope to be of more than palliative value. As the disease is eradicated, the means of its eradication is removed. We must therefore look back to the laboratory and animal experimentation for the development of those discoveries which, it is not too sanguine to hope, will some day give us the weapon by which measles may be effectually controlled.

Since these paragraphs were written there has appeared a startling communication entitled *Measles Toxin*, by Ferry and Fisher. It is a preliminary report of the preparation of a measles toxin, said to be produced by a streptococcus which these authors have recovered from the blood of patients in the early stages of the disease, and which they have named *Streptococcus morbilli*. In many respects this organism is similar to that described by Tunnicliff in 1917. It is agglutinated by measles convalescent serum. It produces a toxin, which will in turn produce sera with antitoxic properties in the horse and the rabbit. An empirical "skin test dose" of this toxin was found to give a positive intradermal reaction in about one half of the individuals who had no history of measles or who were in the early stages of the disease. Such reactions were negative in those who had had, or were convalescent from the disease. Convalescent serum and the serum of artificially immunized animals prevented the development of positive skin reactions, both when allowed to act on the toxin in vitro, and when given in vivo to the subject.

This work must of course be subjected to much elaboration and confirmation at the hands of others, during which time it must run the usual risk of damage by commercial exploitation. Emanating as it does from a commercial research laboratory it will undoubtedly be patented. While monopolism and science are not incompatible, still the wise physician will be conservative in his acceptance of such biological products for the prevention and cure of measles as may be placed on the market during the next few years.

Rightly viewed, the discoveries of Ferry and Fisher, as well as those in the etiology of scarlet fever, are but bricks of bacteriology and immunology which are being laid about the keystone of biological grouping, first placed by Neufeld in 1910. In the clinical use of pneumonia sera we have already seen how easily false structures may be raised, only to collapse. The weakness of such structures, however, is not in the bricks of which they are built, but in the mortar of false hope with which they are cemented. Our opinions must be tempered with *quantum sufficit* of what Osler described as "active scepticism, born of a knowledge that recognizes its limitations, and knows full well that only in this attitude of mind can true progress be made."

REHABILITATION IN TUBERCULOSIS

Work of Placement Committee of the Boston Tuberculosis Association

BY JOHN B. HAWES, 2ND, M.D.

REHABILITATION in tuberculosis simply means getting the consumptive back on the job. It sounds as if it were a simple thing to do but as a matter of fact is a very difficult proposi-

tion. There are special difficulties in dealing with the tuberculous which are not met with in dealing with those handicapped in other ways. The man who has lost a leg or an arm or who is

partially crippled by arthritis has definite, marked, visible and tangible handicaps of which he himself must be constantly aware and which, unless he is utterly devoid of common sense, he must take into account in all of his actions. Such is not the case in tuberculosis. The ex-consumptive may be up to and above his normal weight; he may look and feel well and have very little in the way of coughing or raising to attract his attention to his disease. He can not see or feel the weakness in his lungs and often is not aware of his handicaps or may even refuse to admit them although they are none the less most certainly present. This is one reason why the problem in tuberculosis is difficult. The next reason why rehabilitation in tuberculosis is not easy is that in tuberculosis we are dealing with a "communicable disease dangerous to public health" and one of which the public has a very real, even if as far as adults are concerned, an unreasonable dread.

For these two reasons, therefore, any attempt toward rehabilitation in tuberculosis is bound to meet with difficulties, and yet society must face this problem fearlessly and intelligently if its anti-tuberculosis work is to be of high standard. The state of Massachusetts is spending annually millions of dollars in caring for its consumptives. The cost of maintenance of the state sanatoria, clinics, etc., last year was over one million dollars; and maintenance cost of the Bristol, Norfolk and Plymouth County Sanatoria was \$117,000, \$136,000, and \$119,000 respectively. Boston alone spends officially over \$300,000 yearly in its own tuberculosis work. If these enormous sums contributed by Massachusetts citizens are to prove good investments there must be some attempt and some uniform method to supplement the purely medical and curative treatment now offered by our tuberculosis hospitals and sanatoria by means of which the sanatorium patient can be made a useful, self-supporting and self-respecting citizen. That a certain proportion of all consumptives are going to die and that another proportion may live for years but only as chronic invalids who cannot work is inevitable. But there is a large percentage of tuberculous patients who, after they have spent their six months or a year at a well run hospital or sanatorium or under proper treatment elsewhere, can become and should become useful citizens again if they are given a chance. It is up to us, and by "us" I mean public and voluntary health agencies, the medical profession, and especially all tuberculosis societies and institutions, to give these men and women this chance to resume their place in society once more.

This can be done and is being done in various ways. First and foremost, however, I am strongly of the opinion that the medical profession both as a whole and individually should be pioneers in this work. At present such is not

the case. I wonder what proportion of doctors take the trouble to look up the patients they sent to a sanatorium six months before; who insist, even at the risk of being called "gunning for practice", that such patients come back for examination and advice as to future employment; who after such an interview really investigate the conditions under which the patient has to work in order to find out whether or not such work is suitable; who insist that he return for examination at regular intervals and who, last of all, interview his employer and explain the situation to him and get his coöperation and sympathy. A very small number, I fancy. And yet until general practitioners and tuberculosis specialists realize that this is their job and a most important and vital part of their duty to their tuberculous patient any attempt at rehabilitation in tuberculosis will meet with scant success. A medical profession, then, taught to realize that efficiency in tuberculosis work means not only early diagnosis and prolonged sanatorium treatment but also supervision and practical advice later on is one essential in successful rehabilitation.

Another method of solving this problem, excellent as far as it goes, but one that must of necessity be limited in its scope, is that of the farm and industrial colony. Notably among these are the ones at Papworth, England, and in earlier stages, at Rutland, Massachusetts. At the former, there is what amounts to a model village made up of self-respecting and self-supporting citizens all of whom are ex-consumptives who with their wives and children live happily together, each working at a regular trade. The products are sold in the open market and are in no way subsidized or artificially supported. Medical supervision is constant and efficient. In each case the work provided is of such a nature and the hours of such length as to be suited to the patient's individual needs, abilities and handicaps. This colony at Papworth is a remarkable demonstration of what can be done. At Rutland, Massachusetts, a similar attempt in this direction is being made under the guidance of Dr. V. Y. Bowditch and Dr. Bayard Crane, now ably assisted by Mr. T. B. Kidner who in this country is our foremost authority on this subject. This work at Rutland is still in the infant stage. It should have the sincere and earnest support, however, of the medical profession and of all of us interested in this problem.

The third method of rehabilitation in tuberculosis is by means of special shops or work-rooms where ex-consumptives can work at some light occupation under good conditions and proper hours and constant medical supervision. One of the best examples of such work-rooms is the Altro Work Shop in New York City. This shop established in 1916 under the management of the Jewish Charities has a capacity for 200

patients who make doctors' and nurses' gowns and uniforms. It was run at a small net loss in 1924. Last year \$40,000 in wages was paid to workers. Another similar shop was run by the New York Tuberculosis Association from 1920 to 1924 when it was taken over by the U. S. Veterans' Bureau. The work here was in watch repairing. These are the two striking examples in this country of attempts to bring about rehabilitation in tuberculosis by means of special work-rooms in the midst of a large city. That such shops alone cannot solve the problem any more than farm colonies can do so is evident. They are simply demonstrations in a small way of what can be done and of what must be done eventually only on an infinitely larger scale.

To me this whole problem of rehabilitation has always seemed not only a vital but a most fascinating one. To watch a man who at your advice, even if intensely against his will, has given up everything, has left wife and family and even gone into debt in order to spend a year at some sanatorium, come back at the end of that time fit and healthy, and to then steer his course back into work or business and see him make good at it, is a rare privilege. But I as an individual can do this only with my own private patients and on a small scale. Wishing to enlarge upon it, I put this problem up to the Boston Tuberculosis Association with the result that two years ago a so-called Placement Committee was appointed of which I asked to be made Chairman with Mrs. Anna M. Wright as its Field Secretary. Mrs. Wright has had years of experience in tuberculosis and medical social service work and is admirably fitted for this task. Our limitations have been financial ones. As our budget increases we will have more workers and more funds to devote to this problem.

Up to date Mrs. Wright has spent much of her time studying the problem, finding out every possible means of help, interviewing employers, labor unions and interested individuals, and getting the coöperation and support of all existing agencies rather than as yet trying to establish anything new. What we hope to bring about in our work, some of which has already been done, and what in our opinion are the essentials of success are as follows:

1. To persuade all hospitals and sanatoria from which we recruit our applicants to introduce a system of prevocational training as a part of the patient's regular course of treatment. Under such a system no patient would leave an institution until his ability, physical and mental, to carry on at some work had been tested out. The superintendents of our sanatoria are already showing the best of coöperation in providing us with what data they can in regard to this but until there is a prevocational training school or its equivalent this in-

formation must perforce be inaccurate and limited.

2. To be in a position to assure employers and others interested that there will be constant and efficient medical supervision. In a farm colony or even in a shop this is not so difficult but when patients are scattered over a city, engaged in various occupations and trades, this is a difficult task. So far we have had to depend for such medical supervision on private physicians and dispensaries and have met with little success. As soon as possible and in the near future, I hope, our Association will have its own clinic with its own doctors to do this important work. Under such an arrangement all applicants for positions must report regularly for examination at this clinic. Failure to do so will automatically drop them from our list. It is only by adhering to some such strict rule as this that the patient's health and the employer's interests can be safe-guarded.

3. There must be some means of tiding over the patient and often his family during the earlier weeks of employment and in some cases indefinitely or at least until he becomes self-supporting. To do this there must be close coöperation between our placement bureau and other social agencies official and unofficial to supply the needed funds. This part of the work which is purely one of relief is not a proper function of a tuberculosis association.

4. Finally, we hope to establish pre-industrial training for our applicants in affiliation with the curative workshops and shops for the handicapped that already exist in Boston, in other words, to take over ourselves or assist in doing what I firmly believe should be done to a great extent at least at the various tuberculosis sanatoria and hospitals. I hope and expect to live to see the time when every tuberculosis institution in Massachusetts will have an Occupational Therapy Department and a Prevocational Training School.

A brief summary of our work in 1925 shows the following facts and figures. During the past year, 141 ex-sanatorium patients came to the Bureau, 48 from sanatoria or other medical sources, 41 were self-referred and came through our own publicity, 24 from welfare agencies, and 48 from friends interested in our work or from other applicants previously placed. Of these, 50 or 35% were successfully placed or given vocational training; 16 found their own jobs; making a total of 66 who received work. Of the 75 who were not placed, 37 were found to have an active process in their lungs. It is worthy of note that most of these came from the "self-referred group". 11 were in need of financial relief, 18 were suffering from other disabilities, 4 relapsed and the remainder drifted away.

It was distinctly encouraging to me to note the comparatively high percentage, 35%, of

those placed. The average proportion of placements in other bureaus or employment agencies for the non-tuberculous handicapped in Boston is 25% and rarely over 30%. I was likewise interested in the cost of placing these individuals as compared with the money saved to the community by getting them jobs. Accordingly, on my request, Mrs. Wright made a study of the cost of placing 72 applicants. Her figures show in a striking manner the cost of placement versus the cost of unemployment. It is unnecessary for me to give all the details of this study but in brief these 72 patients earned during the 15 months' time on which her study was based, including the board of 32 who worked in places where board was provided, \$41,352. Granting the standard rate of charity to a single person during unemployment at \$7 per week, had these persons been unemployed and received charity, the cost to society would have been \$15,484, thus leaving as a saving to society due to placing these 72 persons, \$25,868. Although this saving to society in dollars and cents is a cold blooded way of looking at it, and takes no account of saving in health, happiness, and self-respect, it convinced several persons who hitherto had expressed doubt as to the value of this work.

Eventually as we raise more money we hope to have a clinic and a workshop of our own as well as to use other existing shops. We already are cooperating with the colony at Rutland under Drs. Bowditch and Crane. What we need most of all and what we have not yet secured is the active interest and practical help of the medical profession and especially the general practitioners who handle the bulk of these patients.

The following illustrative cases selected from our files represent as is plainly evident a vast amount of careful and painstaking work on the part of Mrs. Wright, Secretary of our Placement Committee, and show the various problems which such work as ours has to meet.

(1) March 11, 1926, referred from the Boston Sanatorium, O. P. D. A young man of 23 years, born in Boston. Went to work at the age of 14 because his father had tuberculosis and he was the eldest of six. He finally developed tuberculosis at the age of 21 and was admitted to the Rutland State Sanatorium and classified as far advanced, with a positive sputum; discharged November 9, 1925, as quiescent. He was an alert, ambitious fellow whose previous history had not been productive of much except tuberculosis. Four members of the family now were working and because of his extensive disease vocational training seemed to promise the least chance of relapse. His physician approved and so he was sent to the State Department of Vocational Rehabilitation and referred from there to the Boston Trade School training in electric wiring.

(2) January 14, 1923. Referred from Welfare Agency. This patient was a boy of 17, born in Boston of Hungarian parents, and the eldest of ten children. His home was crowded and his mother an arthritic invalid. Father earned \$40 a week, holding same position ten years. Parents were of good type. He

was 14 years old and in the eighth grade when he began to break down. In appearance he was tall, good-looking, with good manners but shy. In April, 1922, he was admitted through the Boston Dispensary to the Sharon Preventorium, his board being financed by a welfare agency. Diagnosis was cervical adenitis, phlyctenular keratitis, hilus glands, underweight. He improved and was transferred to the Westfield State Sanatorium in December, 1922. Here he gained 25 pounds in weight, his general condition became good and he was discharged September 23, 1923. He had been a student of the first year Springfield High School while at Westfield and also worked in the dining room for \$5 a week. Then he returned home and entered the second year Mechanic Arts High School, when his mother wanted him to go to work because of the small income in the family. Our Placement Bureau urged his return to school because of his history of tuberculosis and of his excellent school record. The Family Welfare Society helped the family and work was found for him in the summer as a machinist's helper at \$15 a week. He has specialized in aeronautics and has served one term in Washington and signed up for three years with the U. S. A. to become a commercial aviator. He graduated in June. Weight, 145 pounds, and no symptoms.

(3) December 30, 1924. Referred from the Rutland Sanatorium. This patient was an Italian, 35 years old, married, with one child, 18 months old; in the United States 18 years but not naturalized. He graduated from grammar school in Boston and attended two years of evening high school. He reads a great deal, seems remarkably well informed, and calls himself a socialist. He was embittered because he has tuberculosis. His wife went to work when he entered sanatorium and placed her baby with her mother, who paid his expenses for private sanatorium care. In appearance, he is alert, sensitive and should have been in a profession. Always a factory worker, chiefly in foundries; last four years a mold maker and for 18 months prior to his illness a molder of radio parts. Wage, \$45-\$50 a week overtime and piece work. In July, 1924, a private physician had sent him to Dr. Lapham's sanatorium in Rutland. In September, 1924, he was transferred by request to Rutland when he realized treatment would require months and so expense of private care was prohibitive. He was classified as moderately advanced, sputum persistently negative. He made steady improvement and in December, 1924, was discharged with consent as quiescent. The man felt keenly his family responsibility and need of more treatment but refused to consider a return to his former occupation and to a department where work was easier but at less wage. After several arguments he permitted the Secretary to interview employer, who proved interested and rated man as highly skilled. In January, 1925, he was reinstated in assembly department, where patient could remain seated, not piece work, at the wage of \$30. In April, 1925, he was laid off because of slack season. He secured work at Gray & Davis, piece work, wage \$45-\$50 a week. Physical examination in April, 1926, shows no activity, gain in weight, general condition good.

(4) December 18, 1924. Referred from the Boston Dispensary. Patient was a Norwegian woman, unmarried, 31 years old; in the United States since the age of 6. Both parents died of tuberculosis and patient lived with aunt and uncle. She graduated from grammar school and later at the age of 24 entered training school for nurses. In appearance she was dignified, gentle, pleasant, with evidence of hyperthyroidism. She had been a graduate nurse until she broke down; then she cared for elderly invalids and worked only a few months at a time. In 1919 she was admitted to Rutland from the Bos-

ton Dispensary, remained two and one-half years and was discharged in 1912 as quiescent, sputum negative, after which she worked three years. Then she took a long rest but failed to regain strength. In December, 1924, after various attempts at placement she was accepted at a private tuberculous sanatorium as a nurse, wage, \$65 and maintenance. In September, 1925, practically all symptoms had gone, she gained 20 pounds, and left this institution, desiring work near Boston. In one week she secured a position in the private hospital where she had received her training, wage, \$65 and maintenance. In April, 1926, she was working and apparently well.

(5) January 21, 1925. Referred by former secretary of Dr. Joseph H. Pratt's Tuberculosis Class. Patient was a Swiss, age 45, unmarried, a printer by trade. He was very apprehensive over his physical condition and his future. He had worked on big dailies and later was foreman for ten years in a small press. In June, 1920, he had been admitted to the Lakeville State Sanatorium and classified as moderately advanced with a positive sputum. Here he gained 21½ pounds and his condition became quiescent. In August, 1922, he was discharged into the service of Lakeville, where he worked. In January, 1925, he left Lakeville as inactive. Many attempts were made to place this perfectly good man. The Edison Electric Illuminating Company through its personnel manager was willing to give him a chance, but he was turned down by the employment manager because of his tuberculosis history. Temporary work was found for three months at the

North Reading Sanatorium as attendant and then permanent work was secured as doorman in a hotel, wage \$15 with meals; in six months he was promoted as clerk, wage \$18 with meals. In April, 1926, his physical condition was excellent and he was working steadily.

(6) Referred by Dr. L. M. Spear, Robert Brigham Hospital. Patient was a Norwegian, unmarried, 51 years old, self-respecting, energetic, fighting tuberculosis since 1915, sputum persistently positive. Dr. Spear stated there were no symptoms but a positive sputum and thought that if the man could be placed where he could have a chance, he would probably recover. He had been an expert poultryman with excellent references. In February, 1926, he was placed at the Central New England Sanatorium in the poultry department, wage \$50 a month with maintenance.

(7) Referred by self through publicity of Christmas seals. Patient was a woman, 43 years old, unmarried, of Irish parentage. She had not worked three years because of tuberculosis. Her sputum was positive. She came to the Bureau very depressed because of her dependency on a brother-in-law and her long period of illness. She was referred to the Boston Sanatorium for an opinion, where it was thought she was able to work under good conditions. She had been a machine operator on ladies' dresses. In October, 1924, she was placed as a seamstress in a State sanatorium, wage \$65 a month with maintenance. In April, 1926, she was still in the same position, contented, and had gained 20 pounds.

HILUM TUBERCULOSIS*

BY RANDALL CLIFFORD, M.D.

THERE are few conditions which have created more widespread interest both in this country and abroad during the past few years than that of hilum tuberculosis. The reason for this is apparent when we consider the great evolution of thought and progress which has been made in the study of this disease during the past ten years. As a result of research and clinical investigation we have begun to realize that the seeds of tuberculosis are sown in childhood, and that the best results in cure will be obtained when the disease is detected in its earliest stage. With the knowledge that tuberculosis in childhood is primarily a disease of the lymphatic system, it is only natural that greater significance, both in medical practice and teaching, should be attached to the importance of the bronchial lymphatic glands in the spread of tuberculosis throughout the body.

The term "hilum tubercenosis," was adopted in 1925 by the American Sanatorium Association. In discussing the reason for choosing this term Dr. H. D. Chadwick of Westfield says: "We need this term to describe those children whose tuberculosis is as yet confined to the lymphoid tissues about the trachea, the right and left bronchus and the larger subdivisions of the bronchi. It is in these tissues that tubercle bacilli lodge and frequently produce dis-

ease in children from three to twelve years of age. Later, if the disease is not arrested in these glands, the parenchymatous tissues become involved, and then we have the adult type of pulmonary tuberculosis." He adds further that "A new term is needed to keep clearly in our minds a phase of tuberculosis that is primarily an adenitis and just as much an entity as cervical adenitis, the difference being only in the location of the diseased glands." The important thing, it seems to me, is not the name, but the fact that this condition of hilum tuberculosis has been recognized and classified as a definite clinical entity. In order to have a clear understanding of this condition, a few of the fundamental principles of pathology are essential.

A great deal of confusion and controversy has arisen regarding the method of first infection in tuberculosis: whether this occurs by inhalation or ingestion; whether the primary infection is in the lung with the secondary involvement of the tracheo-bronchial glands; or whether the bronchial glands are first involved with secondary extension along the lymphatics to the lung. I shall not discuss the various theories in regard to these questions. The important thing to be borne in mind is that tuberculosis is first and foremost a disease of the lymphatic system, and that the commonest groups of glands to be affected, as shown by

*Read at a meeting of the Dorchester Medical Society, March 27, 1926.

post-mortem studies, are the tracheo-bronchial, cervical, mediastinal and mesenteric groups.

Following inoculation with tubercle bacilli the tracheo-bronchial glands become enlarged, and the character and subsequent course of the infection depends upon a variety of different factors, such as the size of the original infection, whether or not the infections are frequent and too soon repeated, and the general health of the individual. The character of the infection depends not so much upon the age as upon the degree of immunity of the individual. Thus we see in those in whom little resistance to the disease has been acquired, such as is the case with infants and young children, and occasionally with adults who have never come into contact with civilization and tubercularized people, that the disease takes the form of an acute infection. Following a generalized glandular enlargement there is a tendency for the glands to break down, to become caseous, and for the infection to spread either by direct extension from an involved gland to another neighboring structure, or by the rupture of a gland into a bronchus with subsequent lung involvement, or into a blood vessel with a possibility of an acute extension of the process. Hence we have a rapid, fatal progressive disease in the form of miliary tuberculosis, tuberculous broncho-pneumonia, or tubercular meningitis. On the other hand, when a certain degree of immunity has been acquired by the individual, as is usually the case in children between five and fifteen years of age, there is a tendency for the disease to become localized in the lymph nodes with resulting fibrosis, and, in some instances, calcification. If the disease becomes localized there is, according to Calmette, developed on the part of the individual a certain degree of immunity which may help to resist infection in later life. It is in this stage that the disease is latent and gives rise to few, if any, symptoms or physical signs. Numerous pathologists have demonstrated the frequency of latent infection of the tracheo-bronchial lymphatic glands, without evidence of pulmonary disease, in children dying from non-tuberculous disease. There is a very low mortality, and it marks the transitional period between infancy and the adult type of tuberculosis. Bearing these facts in mind, the importance and significance of making a diagnosis of this condition at the earliest possible time are readily realized, in order that we may prevent infection localized in the lymphatic glands from extending and becoming disseminated, or taking the form of the adult type of pulmonary tuberculosis.

DIAGNOSIS

I know of no more difficult diagnosis or one that should be made more guardedly than that of hilum tuberculosis. In pronounced pulmonary tuberculosis of the adult we usually have

clean-cut physical signs and symptoms and a fairly definite X-ray picture. In hilum tuberculosis, on the other hand, the physical signs are conspicuous by their absence and the X-ray picture is not infrequently very confusing. In making a diagnosis of any condition the most important thing, it seems to me, is to acquire all the evidence that is possible in any given case. This takes time, but it is time well spent.

There are five distinct factors in making a diagnosis of hilum tuberculosis: (1) the history; (2) the constitutional signs and symptoms; (3) the physical examination; (4) the X-ray; and (5) the tuberculin reaction.

(1) History. The history is of great importance, it seems to me, in making a diagnosis of this condition.

(a) The history of exposure is particularly important if we can determine that the child has had a *definite exposure* to tuberculosis. I am sure that there are a great many cases of children living with tuberculous parents in whom no evidence of tuberculosis is ever found, and I do not believe that the history of exposure should always be considered as meaning that the child necessarily has tuberculosis. The history of exposure, particularly the history of a child living with the father or mother or some member of the family who has an open case of tuberculosis is, however, a very valuable guide, in that it gives us a very good clue whether or not the child is being subjected to repeated massive doses of tubercle bacilli.

(b) The history of previous infections such as whooping cough, measles and any other acute infectious diseases, such as pneumonia and influenza, should also be taken up. The importance of these infections is not so much of the actual infections themselves as the condition of the child after he has had these infections, and the possible danger of the lighting up of an old latent tuberculosis into activity. A knowledge of the previous infections should be considered of great value to the radiologist.

(c) The history of frequent colds, coughs and sputum is of little help to me as a guide in the diagnosis of hilum tuberculosis in children. In those cases which come to the Pulmonary Clinic at the Massachusetts General Hospital they are present in only very rare instances. It should be borne in mind, however, that in cases of large amounts of sputum there is generally some other chronic lung infection, non-tuberculous in character. Be sure to rule out acute and chronic infections of the upper respiratory tract before attributing the frequent colds and coughs to an underlying hilum tuberculosis.

I think that another important condition to go into in the history is whether or not the child has ever had enlarged glands of the neck or evidence of any glandular enlargement elsewhere. The history of phlyctenular keratitis is of great significance as indicating a possible un-

derlying tuberculous condition. In speaking of this condition Calmette says that "spontaneous tuberculous infection of the eye is observed but rarely in man and cattle. It is scarcely ever encountered except in individuals who, at the same time, have tuberculosis elsewhere, and where found it is as a complication of generalized tuberculosis."

(2) Constitutional signs and symptoms. I believe that these should rank first as aids in the diagnosis of hilum tuberculosis. I also believe that in this condition, as in all other cases of tuberculosis, the signs and symptoms are of the greatest importance in judging how much the disease is affecting the patient. As in pulmonary tuberculosis, the amount of toxemia does not necessarily go hand in hand with the size of the underlying lesion, and I believe the same is true in hilum tuberculosis, that a considerable amount of toxemia may be present when the evidence of glandular enlargement is minimal, and the constitutional signs and symptoms may be the only means of detecting this toxemia. The most important of these symptoms are as follows:

(a) Undue fatigue. One of the most common symptoms is to find that a child is always tired and complains of fatigue. Rarely, however, does the child volunteer this information, but if present it is the first thing the mother notices and mentions to you.

(b) Changes of temperament and irritability are important in so far, it seems to me, as the child is different from normal. In other words, it is always an individual proposition and can only be determined by asking the mother whether or not her child has recently been more irritable than formerly.

(c) Cough and sputum I do not think are very common findings in this condition. When these are present it is important to examine closely for evidence of upper respiratory infection, such as diseased adenoids, tonsils and antrums. When there is a definite hacking, unproductive cough, at times brassy in character, one should always think of some mediastinal pressure, which may, of course, be the result of an enlarged bronchial gland.

(d) Underweight, malnutrition and failure to gain weight are of importance when present. I am not a strong believer in a definite standard for all different types of children, because it seems to me that the most important factor in judging underweight are the home conditions and the environment in which the child is living. Good home conditions with real underweight or failure to gain is significant; bad home conditions plus underweight means nothing.

(e) Fever as a constitutional sign in these children is usually intermittent, occurring in the afternoon, and comes on after exercise, running from approximately 99.6 to 100. As a gen-

eral thing, however, the temperature is normal. Normal temperature does not exclude hilum tuberculosis. It is, however, a very valuable guide to the diagnosis of tuberculous toxemia. When there is a slight afternoon fever, one should always be on the look-out for some hidden focus of infection, non-tuberculous, such as a smouldering endocarditis, before considering it based on tuberculosis. A rapid pulse, I find, is of questionable value.

(3) Physical examination.

(a) Inspection. It seems to me that we do not emphasize sufficiently the value derived from inspection. In the cases which I have seen, one of the most important guides is inspecting the child to determine whether it is a delicate looking child, or whether it is robust and in good health. Our first impressions are often a valuable guide.

(b) Palpation. It is important in these children to search for evidences of enlarged lymphatic glands, cervical, axillary, inguinal and mediastinal. The presence of these glands may not infrequently give a great deal of information. The emphasis on this point has been well brought out by Sir Robert Philip, who declares that in all children great care should be taken to examine the glands in all parts of the body, as indicating a bit of evidence of early tuberculous infection.

(c) Percussion. This should be done very lightly. Numerous writers have found that there is no information derived by percussing out the parasternal dullness as an indication of enlarged bronchial glands; I feel, however, that this should be done, as it is important in ruling out such conditions as an enlarged thymus, or in excluding possible cardiac enlargement or substernal thyroid. From intrascapular dullness I am unable to get much information. Dr. Chadwick, who has had such a vast amount of experience in this type of condition, can undoubtedly speak with authority on the subject, but from the practical point of view it is, in my opinion, of little help. I also believe that percussion of the spinal column is another point in the examination which should not be omitted, as occasionally we may find a marked spinal dullness indicating some condition in the mediastinum, such as a tuberculous gland, causing pressure.

(d) Auscultation also seems to me of very little importance in diagnosis, as the disease being limited to the lymphatic glands one would not expect to hear anything in the parenchyma of the lungs. There is, however, one important fact: an enlarged bronchial gland may, as the result of pressure on a bronchus or lung, give rise to chronic lung infections with rales and change of breath sounds at the bases which may be very confusing. In listening to a chest in which hilum tuberculosis is suspected, one should also note very carefully the type of ex-

piration over the back at the area of bifurcation of the bronchi. A prolonged, drawn-out expiratory note may be present on one side, and this should be considered suspicious of an underlying enlarged gland pressing on a bronchus. The other signs commonly spoken of in this condition, namely, D'Espine's, Eustace Smith's, and signs of dilated veins and hoarseness indicating mediastinal pressure, are very uncommon findings in my experience. When the glands reach sufficient size to give marked evidence of mediastinal pressure there is usually a parenchymatous involvement as well, making the diagnosis evident.

(4) X-ray. The X-ray is of great value in excluding any parenchymatous infiltration and other conditions giving similar symptoms and physical signs. It is also a very valuable guide in so far as it may give us the information that the bronchial glands are enlarged, but on the other hand it does not convey to us whether or not these glands are tuberculous. I know of no more confusing thing than to get a report from the X-ray man stating that the hilum glands are enlarged and probably tuberculous. It seems to me that without a clinical knowledge of this disease the radiologist should not attempt to distinguish between the tuberculous and non-tuberculous hilum gland enlargement in the absence of calcification. The X-ray cannot, and should not be relied upon alone for diagnosis; it is merely a guide, and as such should be considered. I believe that we are, at the present time, relying a great deal too much on the opinion of our X-ray men for making our diagnoses. There are so many factors which may give the same picture as that of hilum tuberculosis that great care should be taken in the interpretation of the plates, and I feel that it should be undertaken only by an expert radiologist working in close co-operation with the clinician.

(5) Tuberculin test. It is essential to have a positive tuberculin reaction before making a diagnosis of hilum tuberculosis. There are certain features which I think should be emphasized; first, that one should have good tuberculin. Second, remember that a positive tuberculin reaction does not make the diagnosis of clinical hilum tuberculosis. It merely means that there is a focus of tuberculous infection somewhere in the child's body; it gives us no guide as to the site of the infection or the activity. A persistently negative reaction in a child of ten or under is good evidence that tuberculosis is not the cause of the child's condition, provided we exclude other conditions known to be factors in causing this test to be negative.

EXCLUSION OF OTHER FACTORS

In the diagnosis of this condition it is of primary importance to exclude such factors as infected sinuses or antrums, enlarged tonsils,

infected teeth, nasal polyps, adenoids, and conditions such as acute coryza or an acute attack of grippe, which may give rise to constitutional signs and symptoms simulating hilum tuberculosis. It has been my custom to have a nose and throat examination of all children in whom there is any suspicion of the disease, and, if the X-ray shows enlarged hilum glands, to have the tonsils taken out, if in the opinion of a good throat specialist this is deemed wise. In a few cases in which this has been done X-rays taken at a considerable period after tonsillectomy have shown a complete subsidence of the infection at the hilum. There are few infections in childhood which cannot give the same signs and symptoms as hilum tuberculosis, and the important feature to be considered is the exclusion of every other possible factor before making a definite diagnosis.

Through education and publicity the fear of the word "tuberculosis" is gradually diminishing. On the other hand, I think that a very important point which should be considered is this: there is a distinct difference between a tuberculous infection and tuberculous disease. The child may be infected but in no way present any signs or symptoms whatsoever. On the other hand, when we tell a mother that a child has tuberculous disease, we are doing not only the child itself, but also the mother a grave injustice, unless every bit of evidence that we can get is obtained and all possible other conditions excluded. I do not think that a diagnosis of hilum tuberculosis can, in many instances, be made at a single examination. If the constitutional signs are of sufficient importance a diagnosis can be made, but not otherwise. In any case where the factors obtained do not all agree it seems to me that a diagnosis of suspicious tuberculosis should be made, but that in no way should the family be led to believe that the child has active tuberculosis.

TREATMENT

The treatment of hilum tuberculosis is similar to that of adult tuberculosis, and is dependent entirely upon the attempt to increase the immunity of the child. In France the Grancher system has been instituted for some time. Under this system when a child is found living in an infected family, the child is removed from its parents and placed in a healthy family somewhere in the Provinces. That, however, is a pretty radical measure. The best that we can do is first to remove the child who is suspected of a tuberculous infection from the danger of acquiring greater infection and more massive doses of tubercle at home. This seems to me a most important point in the treatment. With children having hilum tuberculosis the chief treatment of this condition is along lines of prevention, the great danger being that with a lowered resistance based on undernourishment

and poor home conditions, the liability to pick up a massive infection with extension of the process from the glands, is most likely to occur. The object is to keep the child's resistance up to normal, in order that the infection of the glands may not be allowed to extend, but may continue latent during the transitional period from juvenile to adult age.

CONCLUSION

In conclusion I should like to emphasize the following points:

(1) The diagnosis of hilum tuberculosis is difficult and should be made guardedly.

(2) Frequent examinations and observations of the child over long periods of time are often necessary before a definite diagnosis can be made.

(3) Before making a diagnosis the following conditions must be present: (a) a defin-

ite history of exposure; (b) a positive tuberculin test; (c) definite constitutional signs and symptoms denoting tuberculous toxemia, the most important of these being fatigue, malnutrition, underweight, lassitude and nervous irritability; (d) evidence by X-ray of enlarged hilum glands; and (e) physical signs indicating enlargement of the bronchial glands. The most important of these, in my opinion, are the constitutional signs and symptoms.

(4) If the evidence warrants a definite diagnosis do not hesitate to place the child immediately under treatment. If the evidence does not warrant a definite diagnosis but there are sufficient facts to make one suspicious, keep the child under very strict observation.

(5) Be careful about using the term "tuberculous infection." To us it means little, but to the average mother it means disease and a tragedy.

REHABILITATION OF THE TUBERCULOUS WITH SPECIAL REFERENCE TO THE EMPLOYMENT OF DISCHARGED PATIENTS AT THE RUTLAND STATE SANATORIUM

BY MARK H. JORESS, M.D.

DURING the past twenty-five years the efforts of the medical profession have been directed toward early recognition and early treatment of tuberculosis with gratifying results. The last few years may be called the period of prevention, and it is another step in the campaign to eradicate the disease.

As the result of continuous effort sanatoria were established, methods of treatment were evolved, patients were cured,—some permanently, many temporarily. In a word, the rationale of the problem of treatment permeated the minds of thinkers and workers in tuberculosis. The banner of the crusade has been carried by laymen and women as well as the medical profession, the former lending special aid along the lines of organization.

It must be conceded that the goal of the profession is to prevent and to cure disease; its great mission to alleviate the suffering of humanity. But it must not be forgotten that a diseased organ is only part of an organism; a diseased body has an inseparable, and frequently, very active mind. When the inroads of the tubercle bacillus have abated the convalescing individual hopes to resume the weaving of the "Fabric of Life," to return to social and economic responsibilities. We must help him return to an earning capacity: complete if possible, partial at least. Regarding rehabilitation of the tuberculous Foster¹ says: "There is widespread interest in the problem; yet there is no complete program for handling this part of the work." One hundred thousand people are dis-

charged from our institutions each year. Some of these are proper subjects for rehabilitation or adjustment to meet the individual handicap.

Klotz², speaking on the rehabilitation of the tuberculous veteran says: "Some form of machinery is needed for the post-sanatorium period. To stop with discharge is to omit one of the most important phases in the whole rehabilitation program. Medical supervision or follow-up should be continued for a varying period. The doctor knows how the particular case reacts to work, exercise and fatigue. Through lack of medical supervision, after discharge, the man frequently breaks down again and must be rehospitalized."

What pertains to the soldier is equally pertinent to the man or woman in civil life. It has been our practice at the sanatorium for many years to advise the discharged patient to be examined periodically either by the family physician, if he has one, or to return to the sanatorium for the re-examination. By this means reactivations of disease have been discovered in time; faulty habits have been corrected; unfavorable occupational pursuits have been discouraged and re-admissions to the sanatorium have been delayed or prevented.

Let us assume that the patient has graduated from the sanatorium, and is getting ready to become once more productive. His first question will likely be, "What am I going to do?" In many cases the answer is not difficult; approximately fifty per cent of those with arrested disease place themselves. This group may re-

turn to their occupation, and need no industrial rehabilitation. The rehabilitation of this group is a relatively easy matter. But there remains the other fifty per cent of convalescents who constitute a real problem. And they will require an answer to, "how much work can I do; what kind of work is best suited to my physical condition; where shall I work?" These questions are difficult to answer, for tuberculosis always carries with it the possibility of relapse, therefore great care must be exercised in the "placing" of the group in question.

A very common thought regarding rehabilitation is to obtain a new occupation for the patient. Regarding this Waring² points out, "that it depends upon many factors, e. g., the patient's independent means, family responsibilities, business obligations, immediate working environment, temperament, extent of disease, stability of character, and measure of recovery."

Undoubtedly one of the most faulty ideas about rehabilitation is that an outdoor occupation is necessary. Regarding indoor and outdoor work for the convalescing case of tuberculosis Waring says, quoting David Lyman, "that factory workers hold their condition distinctly better, and office workers far better than the outdoor worker." As for work in general, it must not carry with it physical hardships, for over-exertion is dangerous for the tuberculous. It is a questionable procedure to place an indoor worker with muscles made soft by his occupation on a new job requiring what for him may be severe muscular effort with its attendant fatigue. The patient or his private physician may object to an indoor job because apparently it is contrary to the teachings of the sanatorium. But if a man works eight hours a day indoors why can he not spend the remaining sixteen hours outdoors carrying out a modified sanatorium routine? The answer to this query is in the affirmative, and it is the crux of the entire problem of rehabilitation. It must ever be impressed upon the mind of the convalescing person that the only way he can maintain his endurance and capacity for continued work is to continue "curing" after leaving the sanatorium; "treatment" should follow the day's work; Sunday and holidays should mean the occasion for additional rest. To follow such a post-sanatorium regimen does require stability of character with a determination to keep well. To carry out the post-sanatorium routine intelligently the patient should have received instructions in a well regulated sanatorium. At the Rutland State Sanatorium the "course of instruction to patients" given by the Staff during the year 1925 consisted of 26 lectures embracing every phase of the tuberculosis problem, and in addition informal talks on the wards and individual instruction.

Whatever the occupation sought it should be permanent. Frequent changes in occupation is

a vicious practice for it carries with it changes in habits and environment, and the anxieties that accompany the adaptation to a new job. In a word, "routine" is disturbed and that is harmful because the tuberculous do best under the regularity of routine.

Regarding the outdoor life for the tuberculous, particularly with reference to farming: Tuberculous patients are often advised to go to a farm and live there; farming, however, is laborious work with long hours and frequently unsanitary housing conditions. As for gardening, it is seasonal and not much less laborious than farming. Whatever the line of rehabilitation, the underlying principles of work and exercise, as pertain to the individual case must never be forgotten. These must be well regulated. The discharged patient must be taught to use his energy wisely; he must be taught to conserve his vital forces, and to know his capacity for work as well as his limitations. He must know the significance of undue fatigue-ability. He should have been so educated as to know when to stop. In fine, the tuberculous, being handicapped, shall have been so trained that he can adjust his life to that handicap.

The fields for rehabilitation have been of various kinds:—agricultural and industrial colonies, temporary and permanent; temporary and permanent shops for sheltered employment; hospital and municipal industrial experiments; training schools for tuberculous nurses in the care of the tuberculous sick; and the employment by sanatoria of discharged patients. I shall first describe the various experiments in rehabilitation carried on in England and America; after that I shall consider the work of rehabilitation carried on at the Rutland State Sanatorium.

Reviewing the literature we find that at the close of the nineteenth century (1898) a plea was made in England for the founding of agricultural colonies. The medical reasons given for their establishment were: "complete latency of tuberculous symptoms could not often be obtained, even by prolonged sanatorium treatment, while, on the other hand, carefully measured work seemed to help favorable progress; that the colonists could have medical control, and adaptation to normal working conditions." The ultimate aim of these colonies was to prepare the colonist to resume a suitable occupation after leaving the colony. The social reasons for such colonies were permanent home and work, and the benefits of family and home life.

The industrial colonies have been of two types: the colony proper, where various trades are taught and residence is temporary until such time as will permit the rehabilitated person to obtain a self-supporting status. The other type of colony is the industrial settlement: here the residence is permanent and is intended for those who can never be expected to be re-

habilitated to the extent that they could return to industrial life elsewhere. The two English colonies which have become famous are: the Papworth Colony and Preston Hill. These have been the leaders in the colony idea subsequently tried in other countries. The trades followed in these colonies from time to time have been, carpentry, woodwork, horticulture, poultry raising, pig-raising, printing, bee-culture and jewelry making.

Turning to other fields for rehabilitation, we find in this country the training as nurses of women who have recovered from tuberculosis. In 1904 the Phipps Institute opened the first training school for tuberculous women. The Whitehaven Sanatorium opened one in 1907. The Rutland State Sanatorium opened its training school in 1908.

An interesting description of experiments in industry as carried out at the Phipps Institute is given by Landis⁴. From 1914-1916 observations were made on a group of 30 female discharged patients whose disease was arrested at the time of discharge. They were for the most part garment workers, and the articles selected for manufacture were: shirtwaists, aprons, and hospital linen. They worked 4, 6, and 8 hours a day. In no instance was their health impaired. It was found at the conclusion of the experiment that many of them were able to return to their former occupation, resume their earning capacity and at the same time maintain their health provided they were supervised and were amenable to discipline. At the same time it was noticed that a certain number were unable to withstand the strain of keeping pace with their fellow-workers who were normal.

Another phase of industrial experimentation is to be found in the rehabilitation activities carried on by the Federated Jewish Charities in New York City. For several years the Altro Work Shop has been operated in New York City under supervision of the "Committee for the Care of Jewish Tuberculous." This shop is the first rehabilitative factory for the handicapped in the United States, and the only one whose output has been successfully placed on the competitive market. Those employed have been allowed to do only the amount of work for which they are fitted. Those unable to maintain their families on their earnings have been aided by funds from the committee. During the past year about 80 men and women have been employed. The product of the factory has been washable garments of all kinds suitable for hospitals and hotels, doctors and nurses. Employment given in a shop of this sort is designated as "sheltered employment." This type of employment is an absolute necessity for a certain proportion of the convalescing tuberculous population who can never hope to be able to compete with the well workman on an eight-hour day schedule.

The great value of sheltered employment, both economically and socially, has been very slowly penetrating the camps of industrialism. A few large concerns are not only providing or securing sanatorium treatment for their employees, but are giving them part time work under careful medical supervision. The following three well known organizations, Metropolitan Life Insurance Company, New York Telephone Company, and Standard Oil Company of California, have been providing sanatorium treatment and post-sanatorium employment. The last named company has been starting the convalescing person on four hours work a day, later increasing the number of hours according to the reaction to the initial amount of endeavor.

Regarding the industrial colonies one able critic (Menzies⁵) believes "that as valuable as they are they can play but a very limited part in a national program for tuberculosis in civil life; that the money required to run such establishments be better spent on the development of a good dispensary system together with committees for after-care and assistance." The shop experiment conducted at the Phipps Institute showed that the arrested cases of tuberculosis may be employed in industry with no detriment to their health but that the patient must be under constant medical supervision to attain that end. The Altro Work Shop in New York City certainly exemplifies the relative security with which the rehabilitated tuberculous individual may engage in a gainful occupation, and not only be self-supporting but also support his dependents in a great many instances. Of course the status of such employment is "sheltered," but it is the only kind suitable for a certain group of convalescents.

In the Massachusetts antituberculosis campaign, the Boston tuberculosis Association has been doing a great deal of work along the lines of rehabilitation. Its latest effort in that direction was the creation in 1924 of a placement bureau whose function is to aid discharged patients in securing suitable employment. Ever since the bureau began to function many ex-patients have been placed in varying situations. The last report for 1925 states that 72 had been placed during that year and of this number 51 were working at the end of a year and keeping well on the job. The working plan of the bureau is as follows: The discharged patient, as recommended by the sanatorium physician, presents himself at the placement bureau for employment, a questionnaire is filled out by the physician and is sent to the bureau. This questionnaire deals with the classification of the patient, his condition on discharge, the amount of work done at the sanatorium, and the kind of work best suited for the individual case. One more item in the questionnaire, and we believe it the most important one, the patient's attitude toward treatment while at the sanatorium. It

may be stated as an axiom that the applicant who was cooperative while at the sanatorium will do well providing, of course, the job suits his capacity; while the uncooperative patient will probably not do well after he is "placed."

Our feeling at the Rutland State Sanatorium is that rehabilitation of the tuberculous begins at the time when he is made ambulatory. At this time his exercise and work are to begin in a gradually increasing manner. It has been our practice, after the patient has been going to the dining hall a variable length of time, to prescribe exercise in the form of walking which he takes in the surrounding territory supplemented by work of various kinds. In assigning a certain kind of work our aim is, if feasible, to choose the kind which as near as possible approaches the patient's occupation.

Some of the work the patients are doing consists of sweeping, carrying trays to the bed cases, damp dusting, cleaning brass, washing windows, checking trunks, gardening, working in sewing rooms, general repairing, working on the mail in the sanatorium post office, telephone operating, weather observation and recording, clerical work in the business office and medical record office and in the dental office.

We have been able to increase the patient's work till he is able to do a full or nearly a full day's work. By this means we have been able to check up on his capacity for exercise and work. At times, when the patient has reached the point where he is able to do many hours' work a day, he has asked: "If I can do so many hours' work in the sanatorium, why can't I go home and go to work?" Our answer to this query has been: "Yes you can, but we wish to do this as a tryout; if you can do this work under medical supervision with the education obtained at the sanatorium you can do the same at home."

This method of "tryouts" has proved here, as elsewhere, a gratifying means of finding out what the patients' actual capacity for work is. The exercise and work prescribed is based on no haphazard orders; he is given definite instructions in the form of a "treatment card" regarding any untoward symptoms that may appear in connection with what he is doing. The nurse in charge carries out a systematic check up so that any rise in temperature, appearance of a persistently rapid pulse, hemoptysis, fatigue and dyspnea is followed by discontinuance of all activities.

Coincident with the last prescribed scheme of tryouts, and a natural sequel to the practice, the custom developed which has prevailed ever since the early history of the sanatorium, to take on suitable convalescing cases as paid workers. Early in the history of the practice it was looked upon as an experiment but it soon became evident that it was not only successful in a medical way but it was a potent factor in the entire re-

habilitation problem and a good business proposition for the sanatorium.

While the character of employment is theoretically "sheltered" many of our employees are capable of returning to their former or some other suitable occupation, and, also, earn more money, but they prefer to remain at the sanatorium and benefit by constant medical supervision and advice. Also with the great majority, the sanatorium has "grown on them" so to speak.

The percentage of tuberculous employees has varied from 50 to 65 per cent. Through this custom of employing discharged patients many have been enabled to live and to support themselves who might otherwise have gone back to civilian life and unsuitable and unhealthy employment, or unsuitable surroundings at home, and under such conditions might have broken down or become permanent dependents. By means of this scheme of rehabilitation patients have been enabled to earn money and be self-supporting; to live the sanatorium life, enabling them to continue "curing" after working hours; and, the most important, to work under strict medical supervision, i.e. to have a regular follow-up which is so essential in the tuberculosis problem.

As proof of the success we have achieved in this rehabilitation program, let us study the records of some of our employees: one woman occupying an important position began her duties in 1899 while having a bacillary sputum which disappeared soon after and has remained negative ever since; two of the men in charge of the grounds, gardens, and greenhouse have kept well the past 22 years; one of the housekeeping assistants has been in practically continuous service for 23 years. One of the men working in the store room has been in service for 20 years. One man occupying an important position in the commissary department has been in continuous service for 14 years. One of the clerks in the business office has been in continuous service for 14 years, and not only has she shown the capacity to stand the strain of indoor work but a high degree of business efficiency. Two of our stenographers have been in continuous service for 6 years, doing as much, if not more at times, than the average stenographer in the city office.

Turning to our training school which is the vital part of any hospital, we find that the first class started in 1908, and numbered 10 pupils. At the present time the school numbers 50. For a long time they were recruits from among our sanatoria graduates. Gradually the school was being filled by graduates of sanatoria of our neighboring states, particularly that of Connecticut. The past few years, we have had a large number of "contact cases" enter the school. Of the last named students it may be said that not only do they enter a school of nursing education they actually enter a "preventorium life." The

latter motive has borne fruit, because of constant medical supervision it has meant more than once the diagnosis of early disease and the institution of early treatment with ultimate good results.

Since 1908 we have been training women in the care of the tuberculous sick. I wish to emphasize that the training of our nurses has not been one sided. For several years the school has been affiliating with general hospitals. Many of the graduates are holding important positions in this and other hospitals and sanatoria. The following data regarding the training school are interesting: 104 nurses have graduated since 1908 and graduates of the training school have filled the following positions: One dental assistant in the U. S. Veterans Bureau, 4 nurses in the U. S. Veterans Bureau, 2 district health nurses, 20 head nurses in this and other sanatoria, 1 nursing supervisor in the western part of Massachusetts, 2 assistant superintendents of nurses, 2 night superintendents of nurses, 1 matron and 2 superintendents of nurses.

A retrospective analysis of what has been accomplished at the Rutland State Sanatorium reveals that tuberculosis is not a hopeless disease, that if the man or woman be given a reasonable chance for taking the cure early enough the opportunities for recovery are good and that rehabilitation of the discharged patient as has been carried out at Rutland has been very successful. Many of the patients treated at the sanatorium have returned to their former occupa-

tions or similar pursuits, their subsequent medical status in the way of follow-up has been more or less uncertain, while the large group of discharged patients from our sanatorium and comprising about 65 per cent of the present number of total employees have been kept under strict medical supervision, at least during the early period, which is the most dangerous period subsequent to discharge.

The sustained effort in this enterprise of rehabilitating those who have succeeded in staying the early ravages of the disease has been a gigantic task. The successful outcome of this enterprise has been fostered by the slogan of co-operation between the medical, nursing, and lay departments of the sanatorium. To the present superintendent of nurses credit is due for the amazing development and standing of the training school. As for the rehabilitation of both the nursing and lay groups of discharged patients the present superintendent has been for many years a very skilful pilot in the troubled waters of rehabilitation.

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ANTI-TUBERCULOSIS WORK OF TODAY*

BY JOHN RITCHIE

IMPROVEMENT in methods and consequent quickening of work of accomplishment is the spirit of today. If one seeks to trace the history of effort to better the health of the people, he will find this to be everywhere a dominant principle.

Public health administration began with warfare on prevailing communicable diseases. The Board of Health of Boston dates back to a serious outbreak of smallpox in the city, and in other cities similar conditions so impressed themselves on the people that they caused the establishment of both official and non-official health agencies.

For a long time official agencies used police powers largely in combatting communicable disease, and in fact the legal background of official health work is today of this nature. Much of the work undertaken under this early idea was in truth shutting the stable door after the horse had been stolen. Then there came what might be termed the sewer gas and garbage period,

when great activity was developed in caring for these disagreeable factors. Disposition of municipal wastes and inspection of plumbing came to be important functions of the health department. Then it was discovered that odors and uncared for garbage are not closely related to health, save where the latter might be the breeding place for flies, or indifference to them an index of low sanitary standard of the community.

Prevention has now come to be a most important thought in public health work, and we stand today on the ground that it is economy to prevent disease, aside from the humanitarian factor. We realize that efficiency demands that disease be prevented, and that it is a waste to wait to cure it in its developed stages. This line of public health progress has been paralleled in the work of voluntary health agencies.

In the wide consideration of the whole matter of public health, it is to be borne in mind that health education of the people must underlie the entire work. No matter how up-to-date and progressive a health official may be or how well

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fitted to carry on the work, he can not for any length of time maintain a course of procedure unless he is supported by the public opinion of his community.

A striking example here lies in the mosquito situation. Citizens in a good many places about Boston, and Malden is one of these places, have the mosquito pest to such an extent that working in one's garden becomes a disagreeable chore instead of the pleasant occupation that it should be, while sitting out of doors in the evening, excepting in screened porches or piazzas, is a lost art.

Yet it is a well-established fact that mosquitos can be controlled. Resorts in New Jersey, where these insects were formerly so active that the name, "Jersey mosquito," is proverbial, have in the interests of better business been freed from the scourge. There is in Massachusetts an association ready and anxious to give experienced advice in mosquito prevention, but public opinion has not yet reached the standard of taking advantage of the means at command. Public opinion must support this or any other advance in good work.

Now in its educational program a health department has some handicaps. The street department of a community is constantly impressing its activity on the citizens. Every one remembers some temporary inconvenience during an important construction. The police department has its men in uniform, its signal stations at the street corners, its clanging patrol automobile and the constant reference to its work in the accounts in the newspapers. The fire department leaves no question as to its activity when there is the impressive rush of engines and ladder-trucks through the streets. All these matters serve to establish a public opinion as to the necessity and value of the services.

A health department has no such spectacular means of advertising its work. Its officials will be pleased with their success when they have been able to reduce the number of sick and knock a decimal or sometimes a unit from the mortality rate. Even this they must do in the face of opposition from various influential groups of ignorant men, or from organizations of sincere but uninformed or prejudiced persons of greater intelligence. In spite of these handicaps and of that opposition which comes from those who would carry on business without regard to the health of the people, the great health movement has made very substantial advances.

Anti-tuberculosis effort has had a growth like that of general health administration. It has been developed very largely by unofficial agencies. These have the advantage that they do not have hanging over them the restrictions of state or municipal auditors, who must set their standards by the strict letter of the law. This freedom has permitted the voluntary associations to undertake promising experiments, and

on the success of these experiments has been founded a great deal of the real progress in health work. When facts have been established by the experiments, official health agencies have been ever ready to take advantage of them.

With disease in the midst of the people, the first natural impulse has been to try to cure the sick. In tuberculosis this was the principal field of effort for a considerable time, and today it still constitutes an important part of the work. Everywhere there are sanatoria for adults, who after treatment return as arrested cases to their homes. The sanatorium plan has developed so that not only adults with consumption, but both adults and children with other forms of the disease have provision made for their care in public as well as private hospitals.

"Prevention is better than cure," is the health rendering of the old proverb, "A stitch in time saves nine." Prevention now is the aim of much of the health work of both public and private agencies. It may be said that today prevention and its aider and abettor, health education, are major activities in tuberculosis and in other lines of health effort.

The structure of prevention is rapidly growing, some features, like the open-air or open-window schools, or the health camps, appealing at once to the people. Municipalities now recognize the open-air school, developed by a private agency, the Boston Tuberculosis Association, to be of sufficient importance to be included in the regular school program.

Prevention as an idea, is of course not new in this country. When the Rev. Increase Mather argued from the religious point of view in support of vaccination against smallpox, he was laying distant foundations on which the structure has slowly grown. It has had its great recent impulse from the fact that examinations which number thousands lead to the belief that a very large percentage of Americans acquire the tubercle bacillus while they are very young. Most of these individuals, through their resistance, are able to hold the bacillus in check, and some carry this resistance through life. With the seed planted in the human body, as in the case of other seeds, it will germinate if given suitable conditions and proper soil. Since conditions that lower the resistance are present in the lives of many children, especially in congested sections of cities or municipalities, these children develop tuberculosis and are the recruits for future armies of consumptives.

Such being the general conditions, the plan today is to examine children to see whether they have any symptoms of the malady. As a by-product in this examination, children are found without definite symptoms, but who are seriously underweight or give other evidences of disturbances within the body. When such children are in homes where there is an adult consumptive there is danger.

In its ten-year program the Commonwealth of Massachusetts is making examinations of children. It furnishes skilled experts to help in and to direct if need be the technical processes, but it asks the co-operation of the municipality. With results given to it by these examinations, it lies with the community to follow up the information with other examinations and with proper preventive treatment. In many cases the follow-up rests with the local voluntary organizations.

At the present moment there are two ways of building up the health of children, to provide in them reserve strength or resistance—health education and preventorium care. As a step to the latter, the summer health camp is the feature that is proving attractive to the people.

In the matter of health education, this is left very generally for private agencies to undertake. One would naturally turn to the schools for the means of giving school children instruction in the care of their own health. But here one is likely to be disappointed, for with the exception of two cities in this Commonwealth, Malden and Newton, the public schools depend upon text books and the instruction that the regular teachers can supply. In an age when there is so much emphasis laid on practical instruction, where the "laboratory method," or teaching students by making them do something, is employed in so many studies, it is disappointing to find that health education has not yet been adequately considered. In Malden and in Newton the public school systems have introduced studies in which each pupil is made the custodian of his own health, watches it, keeps account of it and in a scientific way learns the principles underlying health, and in the formative period of life establishes health habits.

There are many schools in the state and country that are not public schools, the list including parochial and private schools. In these the voluntary agencies have found an extensive field. The parochial school management is planning, I am informed, a definite line of standardized health instruction, but until this is accomplished the parochial schools quite generally avail themselves of the Modern Health Crusade, this being introduced by the local anti-tuberculosis society. Teachers in the public schools, who have the interest to assume the burden of introducing the Crusade, have made use of its program and material. The Crusade has certain obvious attractions. It has the dramatic features of costumes and ceremonies and the psychology of competitions. It makes the child the care-taker of its health, with score cards, etc. It makes him a health missionary to his home, oftentimes with striking results. The Modern Health Crusade is a powerful factor towards the formation of the public opinion which should support movements for the health of the

people. In presenting it the non-official agencies are paving the way for the action of official departments which later is certain to come.

The summer health camp, as a stepping stone to the preventorium, is a field in which the energies of non-official agencies are working for the betterment of public health. Here it is interesting to watch the growth of the movement. One would naturally expect that a community about to establish a camp would take advantage of the experience of other communities. Not at all, invariably they begin with the day camp with the children returned to their homes at night. One needs only common sense to realize that under such procedure, a part and perhaps a large part of what has been gained during the day is lost when the child spends the night in the unfortunate environment that has been responsible for his subnormal condition.

Communities that begin with the day camp always come later to the day-and-night camp, with children kept continuously for two, four or six weeks. Communities with this kind of camp find it beneficial to the children and in general have been able to increase it in size. The children remain long enough to receive substantial health benefit and they learn about cleanliness, fresh air and sunshine, the need of regular hours for rest and sleep, the advantages of moderate exercise and something about proper kinds of food. They find out about normal weight and learn a little about records and charts. These are all of them important factors towards a bettered health of the individual and a practical health education for the family as well as for the child.

"Half a loaf is better than no bread," so the half-loaf of the health camp must be accepted as an important step forward, and largely on the part of voluntary agencies, in the war on tuberculosis. But in Massachusetts, are we not ready to insist on the "whole-loaf," the establishment of preventoria? These are camps which retain the children night and day for months at a time, until there is established in the child a resistance that will probably be enduring. Candidates for the preventorium should be underweights, without clinical symptoms of tuberculosis, but contact cases, which means in general, with an adult consumptive in the home. There is good reason to believe that such children if uncared for, will become consumptives, and a burden on their families or the community. The preventorium has practically proved that such children may be made self-supporting citizens and remain so. It is a duty to humanity to save them, and it is an economy to have them an asset instead of a liability.

The step forward to the preventorium is a long one and in the state of Massachusetts there is only one such institution, the Prendergast Preventorium of the Boston Tuberculosis Association. This has proved so successful that al-

ready large gifts for its support and extension are coming its way. Thanks to the advanced ideas of its representatives in the General Court, Malden has the legislation which will permit it as a city to establish a preventorium, and use for the purpose appropriations from its public funds. The city has thus an opportunity to be the pioneer in municipal work of the kind, but thus far public opinion has not been ready to support the movement.

The preventorium requires considerable outlay of money. For a summer camp shacks assembled by volunteer labor or remodelled farm-houses or barns may suffice. They are occupied only a few weeks in the year. The plant of the preventorium must include dormitories that are practically out-of-doors, dressing rooms at hand which can be kept warm in winter, baths and toilets with running water and adequate drainage, heating outfit, equipment of lights, with kitchen, warm dining room and an open-air school room. There should be a playground at hand and the shade of trees is especially desirable for the rest periods. Such an equipment is really necessary for a successful institution.

The Prendergast Preventorium is thus equipped, and has quarters for the matron and her assistants, and a room for the examinations. Candidates come from the various out-patient departments in the city, the prime requirements being underweight conditions and contact in the home. Out-door life, proper nourishment, supervised exercise and rest are the essential factors to improvement. Frequent examinations, weight and health charts, correction of defects and medical treatment when necessary, constitute the medical portion of the work. Regular school sessions, with the teacher supplied by the School Department of Boston, care for the educational needs, attention being given to the principles of right living as well as to the three Rs. When normal conditions have been established in the child, whether in three months, six months or a year, he goes back to his home, subject to frequent follow-up visits the reports of which are a part of the preventorium records.

Statistics, which it is not necessary to quote here, but which are at the service of communities interested in the matter, show the success of the Prendergast Preventorium. Hampden County is nearly at the point of establishing such an institution, having a permanent plant with the necessary equipment in an excellent location at Westfield. Through the co-operation of the Bristol County Tuberculosis Hospital and the county health association, there is a spirit likely in the near future to establish a preventorium where there has been thus far a health camp. Malden already has the legislation and awaits only the formation of the spirit to carry on. These are indications of the trend of the times. "Let well enough alone," is by no

means the watchword of progressive communities, but rather, "Let us, then, be up and doing."

SUMMARY

While care of the adult consumptive is still necessary, prevention is the promise of the future, dealing very largely with the young. Examinations are already selecting children in need of treatment. The preventorium promises to furnish resistance to such children, to give to them a measure of health education and to establish health habits in them during the formative period of life. These factors must result in the lessening of the number of adult cases in the future. The health camp is the temporary stepping stone to the preventorium.

THE NATIONAL METHODIST SANATORIUM

The first unit of the National Methodist Sanatorium was recently opened at Colorado Springs, Colorado. There was no formal ceremony. The official dedication and opening will take place November 9th while the Board of Bishops is in session at Denver, Colorado.

This is the first unit of the \$2,000,000 Sanatorium. The entire project when finished will have 500 beds and is for tuberculosis patients only.

Mr. G. M. Hanner, superintendent, announced that the new unit has a capacity of 52 beds and that 39 registrations were made at the time of opening. The Sanatorium fronts on Boulder Street, is 100 ft. back from the sidewalk, is 165 ft. east of the Nurses' Home at Bethel Hospital. It is four stories high with a basement and roof garden, with electric service throughout. It is practically built of glass and concrete. There are 635 windows in the building, 3,180 lights of glass and all sashes are of steel and fire-proof. The walls are of light colored golden pressed brick on smooth surfaced concrete foundation, with Indiana limestone trimmings. All floors and staircases are of concrete.

The roof garden is a great out-of-doors—a wonder place, where the patients can commune with nature. In inclement weather there is an enclosed part which is of glass so the view of the mountains and foothills is never cut off. A gorgeous sunset in Winter may be enjoyed with all the delights as in Summer.

Bishop C. L. Mead is chairman of the Board of Directors and vice-president of the national Board of Hospitals, Homes and Deaconess Work of the Methodist Episcopal Church.

Other officers of the National Board, which has headquarters at Chicago, are Bishop E. L. Waldorf, Kansas City, Mo., vice-president; Dr. N. E. Davis, Chicago, secretary; Dr. Samuel W. Robinson, assistant secretary, and Bishop Thomas Nicholson, Detroit, Michigan, president.

The Massachusetts Medical Society

THE CONTROL OF THE COMMUNICABLE DISEASES PREVALENT IN MASSACHUSETTS*

With a Study of the Mortality Due to Them During the Past
Seventy-Five Years

BY EDWARD G. HUBER, M.D.

(Continued from page 544)

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8. INFLUENZA

It is easier to trace the history of most of the other contagious diseases than of influenza, because in the case of the latter the character of the epidemic rather than the clinical features of the disease itself is depended upon to identify the various epidemics in history. In those diseases characterized by distinct clinical features which have not varied much from century to century, the recorded descriptions of the signs and symptoms are valuable criteria in diagnosing the epidemic; but the student of the history of medicine has never had this advantage in the study of influenza, for the diagnosis of this disease is scarcely ever perfectly clear, even now, except at the height of an epidemic. There are almost as many "first" recognized epidemics as there are writers on the subject. The dates for these respective epidemics vary from 1173 to 1510. Warren Vaughan goes a little further into the field of conjecture when he observes that there is as much evidence pointing to 395 B. C., when there was an epidemic with high mortality in the Greek Army at the siege of Syracuse, as there is for ascribing any other date for the first appearance of the disease. There have been many epidemics since that time which might have been influenza, and their characteristics have varied not a little. During the eighty years that mortality statistics have been recorded in Massachusetts there have been two periods when influenza prevailed, namely, 1890-1892 and 1918. The pandemic of 1848 either did not affect Massachusetts or the records are defective due to poor reporting. During the seven years 1842-1848 there were only 196 deaths reported from influenza, and 1844 was the high year, with 68. During this period,

however, reports were not received by the registration office from the entire state, so the data for those years are not included in this study.

The chief difficulty in any study of influenza lies in the confusion in diagnosis. This exists not only in the sporadic cases but also during the early and late waves of an epidemic. It is only during the height of an epidemic that the confusion is at a minimum and the probability is that then some cases are called influenza which really are not. At such times especially, and between epidemics also, there has always been a not inconsiderable tendency to diagnose as influenza cases of sinusitis, tonsillitis, bronchitis, coryza, and in fact all other similar diseases of the upper respiratory tract. This is due of course to the fact that there is no other basis than a clinical one on which to make a diagnosis, and unfortunately there is no well known standard definition as to just what influenza is. The disease differs much at different times, and there are clinicians who say that "grip" and influenza are not identical. The diagnosis cannot be a definite one until it can be made otherwise than on a vague definition. As Zinsser says, the diagnosis of influenza in inter-epidemic periods has been "more a clinical surmise than a scientifically formulated conclusion." At the apex of an epidemic, the diagnosis has more chance of being correct, because the general susceptibility is so great that comparatively few have escaped infection. Epidemics of influenza have such pronounced characteristics, namely the very rapid rise and fall in a community and the speed of its travel from place to place, that these features alone often make the diagnosis of the individual case. During the earlier waves of the recent pandemic, the disease was not recognized by all. It was called "three day fever" by some, and sandfly fever by others of the most competent of observers. Again, the later waves are so masked by the fatal complications that it is difficult to draw the line between the disease and its sequelae and complications.

The identity of the causative organism is even more a matter of doubt than it was at the end of the pandemic in the early nineties. At that time the Pfeiffer bacillus was quite generally accepted as the cause, and diagnoses

*Published by the Committee on Public Health of the Massachusetts Medical Society.

were based on finding it. But bacteriologists obtained such varied results in 1918 that the subject has been entirely reopened. Another organism, *Bacterium pneumosintes*, a filterable virus, has been brought forward as an etiologic factor and in spite of an extremely small amount of positive findings has obtained wide acceptance. But many are still not convinced that *B. influenzae* is not the cause. In one of the best epidemiologic studies of any disease Zinsser sums up the evidence for and against

tween the 1890 and 1918 epidemics. The crude mortality rate exceeded 100 per 100M once only, in 1918. Until the 1890-1892 peak it had not exceeded 10. There may have been an increased influenza mortality rate in Massachusetts in the forties but there is no statistical evidence except that from 1849 to 1888 there was a fairly uniform decline which had wide fluctuations because of the small number of deaths. There was a similar decline after the 1890 epidemic and reasoning from analogy

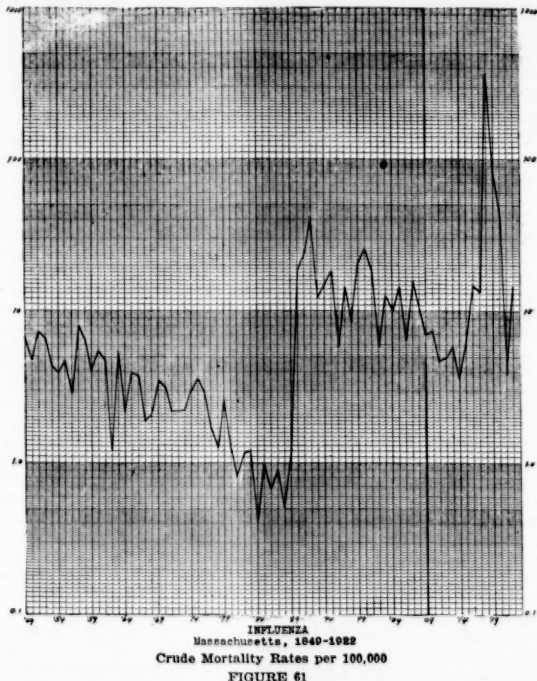


FIGURE 61

B. influenzae and concludes that the evidence points (with uncertainty, however) to that organism as the probable causative factor. Brownlee's idea is that there is a continuous variation in the virulence of this organism; but this view has not received general recognition.

Figures 61-66 show, respectively, the crude and specific age mortality rates for influenza in Massachusetts from 1849 to 1922. It is clearly understood that such data have particularly distinct limitations in the case of a disease in which there is no well defined way of making a diagnosis, but the graphs are presented in order to view roughly certain comparisons be-

fore causes of death were reported. In 1884 the declining rate actually dropped below 0.5 per 100M. In that year only eight deaths from this disease were reported in the state. However, there was a moderate rise in 1889 followed by a very steep ascent of the curve in 1890-1892. After that peak the decline was less uniform and with greater fluctuations than had been the case forty years before. There was one noticeable peak in 1900. In 1916 there was another sharp rise comparable to that of 1900. The rate remained up in 1917 and then made its unprecedented ascent to the

peak of 1918. It therefore appears that influenza was on the increase before 1918, for this rise in 1915-1916 was fairly general throughout the United States. Between the pandemic of 1890 and the low rate in 1914, the crude rate was constantly higher than it had been at any time since 1865, and not much lower than the preceding highest rates. The graphs showing specific age mortality rates show practically the same phenomena as that for the crude rate ex-

allowing for bad reporting it does not differ much except in infants, from the figures for 1890 and 1900. It can be seen that the rates for children under 5 and for the age group 40-59 have always been about the same but that during the 1918 epidemic the group over 60 suffered markedly less than ever before, and at the expense particularly of ages 20-39 and to a less extent of the adolescent age both of which groups had been afflicted but little in 1890. The

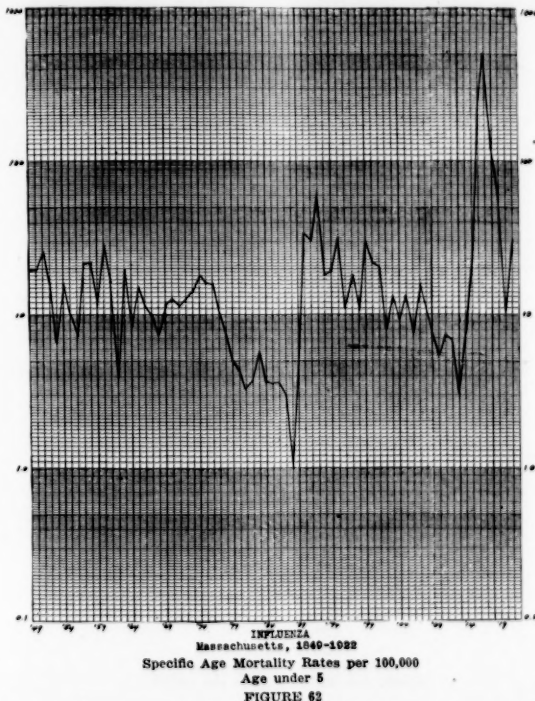


FIGURE 62

cept for certain differences which are more succinctly brought out in table 10. In that

TABLE 10
PER CENT. OF TOTAL DEATHS FROM INFLUENZA AT
GIVEN AGE AND YEAR, MASSACHUSETTS

	0-5	5-19	20-39	40-59	Over 60	Total
1851	40	8	0	5	47	100
1890-1892	14	4	9	14	59	100
1899-1901	11	2	6	11	70	100
1918	14	10	56	14	6	100

table is given, for the years indicated, the per cent. of total deaths in each of five age groups. The year 1851 is included because

1890 epidemic was one which attacked the aged, while that of 1918 found about the same proportion (55-60%) of its victims in the 20-39 age group. It has been suggested that this relative immunity of the aged in 1918 was acquired by them in 1890 but other evidence does not indicate any such extended immunity.

Susceptibility to influenza seems to be universal, otherwise there would not be so sharp a rise and fall in an epidemic. For the same reason, so-called predisposing factors such as exposure to cold, mental and physical fatigue, etc. cannot be of much importance. Too much stress is laid on this point in much of the health education literature which is distributed in the

fight against the communicable diseases. Apparently the healthy are as readily or possibly more readily attacked by a contagious disease, than are the debilitated.

There have been reported in Massachusetts 31,030 deaths from influenza from 1849 to 1922. Of these, 51.6% were females. It is ordinarily stated that males suffer more because of greater opportunities for exposure. During 1918 there were almost 14,000 deaths attributed

years have failed to bring forth any experimental evidence of the transmissibility of the disease. The climax in these studies was reached when the exhaustive investigations conducted by Rosenau (characterized by Zinsser as the most complete ever made on human beings) failed absolutely to furnish any evidence that the disease could be communicated to another individual in any of the ways thought to be effective. Influenza is not unlike measles

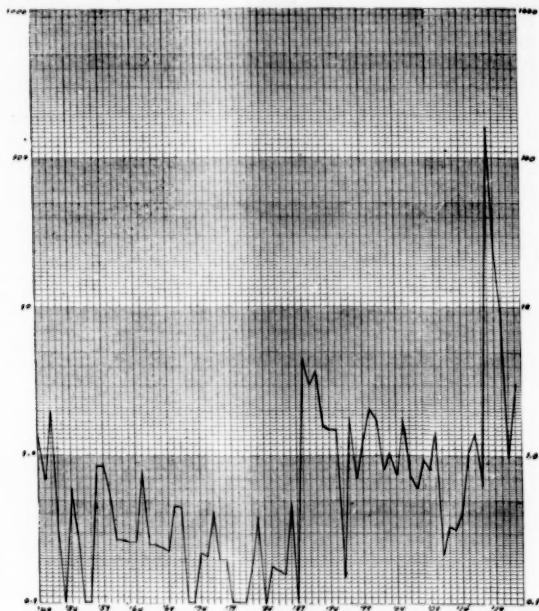


FIGURE 63
INFLUENZA
MASSACHUSETTS, 1849-1922
Specific Age Mortality Rates per 100,000
Age 5-19

to influenza in Massachusetts, and in that year 53.3% were males.

Neither climate, season or weather plays any rôle so far as has been determined thus far. The 1918 epidemic raged under widely divergent meteorological conditions.

It was not until 1889 that influenza was generally regarded as contagious although a few writers had advocated it during the preceding two or three centuries. In England, from 1850 to 1880, there were a number who believed in its communicability. The discovery of the Pfeiffer bacillus and its observed relation to influenza was sufficient to swing the balance although there was no actual proof. Succeeding

in many respects, as far as transmissibility is concerned. Evidence as a whole is preponderantly in favor of the communicability of these diseases yet all experimental efforts to convey the disease from one individual to another have been equally unsuccessful in each disease.

The actual method of transmission of the disease is of course unknown but it is generally agreed that the infectious agent leaves the infected individual with the secretions of the upper respiratory tract. Droplets expelled in coughing, sneezing, and even talking are thought to be the common method. Such infected salivary spray may be inspired by the

prospective victim, or caught on the conjunctivae and then washed into the naso-pharynx. Lynch and Cumming believe, and have presented excellent evidence to uphold their thesis, that unsanitary methods in washing dishes played a leading rôle in transmitting the infection. It therefore seems safe to assume that the chief means of conveyance of the disease is contact, direct and indirect, with other human beings.

This problem may be inextricably bound up with that of a possible fluctuation in virulence of the causative organism so that much more information than is now available will be needed to solve it.

The complete failure to control or even moderate the recent pandemic is well known; it has concentrated research work on diseases of the respiratory tract with the hope that when the

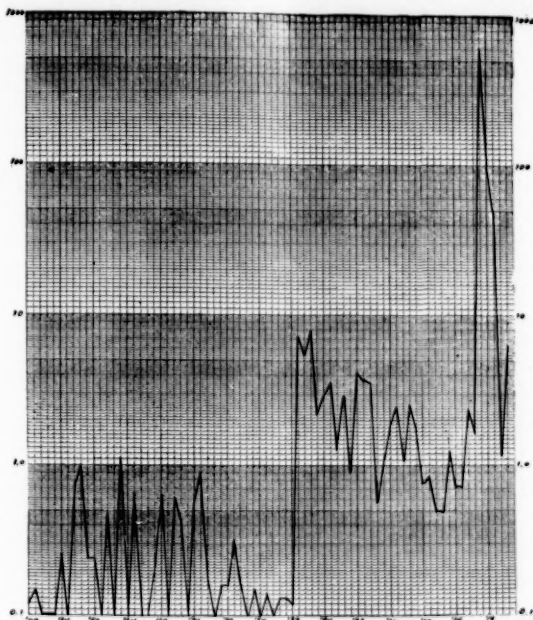


FIGURE 64
INFLUENZA
MASSACHUSETTS, 1849-1922
Specific Age Mortality Rates per 100,000
Age 20-39

Dust has also been proposed as being a vehicle for the organism.

There are probably carriers, but in the absence of any definite knowledge as to the etiology of the disease, it is of course impossible to be certain. There are too many variables in the problem. If the Pfeiffer bacillus is the cause, carriers are very numerous. There are as many obstacles to determining what immunity, if any, is acquired, as there are in the study of any other feature of the disease. Different writers hold entirely different views, but the more conservative opinion is that what immunity is developed by an attack is short-lived, lasting from a few months to a year at most.

next pandemic occurs, we will not be so wholly unprepared as in 1918. There are so many questions which must be answered before control is possible that it is difficult to say which is most important. First of all, however, inter-epidemic research work must have for its basis definite knowledge as to whether the disease now called influenza is the same as that which prevailed during the pandemic. In other words, is the disease now endemic the same as that which was pandemic but with attenuated virulence, or is the focus from which the next pandemic will come located in some unfrequented corner of the earth? It is not known where the 1918 pandemic started; if in-

formation of this nature were available future epidemics might be anticipated and at least modified. Our present knowledge, if it could all be applied, would not prevent epidemics, but it might lessen their severity.

There are many difficulties in the path of the control of influenza, most of which have been mentioned but which may be summarized as follows:

1. Confusion in diagnosis.
2. Ignorance as to etiology and method of transmission.

but if influenza had then been a reportable disease, attention would have been attracted to it by the many who diagnosed it correctly. If any progress is to be made before the next pandemic many studies must be made, and present indications are that statistical and epidemiological studies are most important, surpassing even the value of etiological research. All cases should therefore be carefully and conscientiously reported.

Isolation and quarantine are also ineffective, and the latter may well be dispensed with.

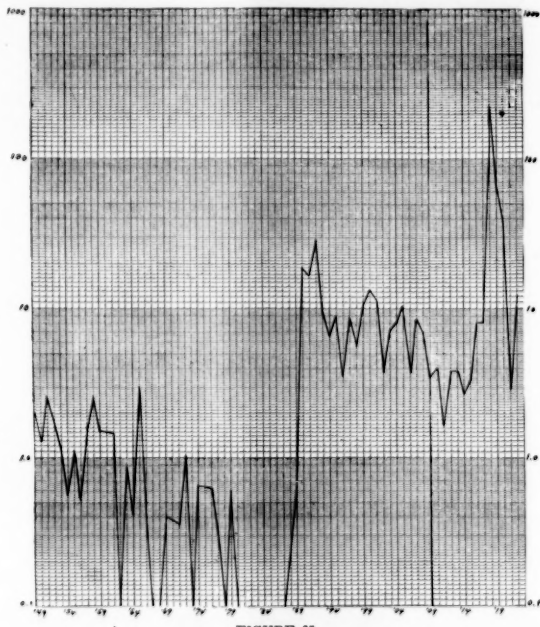


FIGURE 65
INFLUENZA
MASSACHUSETTS, 1849-1922
Specific Age Mortality Rates per 100,000
Age 40-59

3. Ignorance as to period of infectivity of the patient.
4. Universal susceptibility.
5. Brief immunity.
6. Very short incubation period (1 to 4 days).

The first point in a system of control is the reporting of cases by the attending physician. This may seem useless, so far as actual results are concerned for health authorities are powerless to cope with the disease. Once an epidemic is under way, it must run its course, but good notification would give preliminary warning so that the very first cases could be recognized and studied in the laboratory. As was stated previously, the early waves of the 1918 pandemic were often not recognized as such,

However, its effectiveness was proven in Australia, where a strict quarantine kept the disease out of the country for about six months, until it was milder. All cases should be kept in bed and not allowed to move about freely as many did in 1918. This is, as in measles, one of the very best therapeutic measures that can be taken, since the fatal complications are reduced to a minimum, the patient being freed from the risk he runs of contact with carriers of secondary invaders. Patients in bed can easily be isolated and concurrent disinfection practiced, with the idea of protecting the infants and young children of the family who remain at home and would not otherwise be

exposed. Such isolation is far from perfect even under the best home conditions, but it is better than nothing. Hospitalization is a disadvantage to the patient for two reasons; first because moving him is bad therapeutically, and second because in a hospital he is more subject to complicating infections.

The closing of schools as a control measure seems inadvisable. In school, children are kept at a distance from each other, which is not true during their play. There is therefore less in-

health authorities. As in many of the communicable diseases the main thing to be taught is the necessity of lessening the transference of saliva from one individual to another. So far as is known this is the most important method of transmitting a number of diseases. But unfortunately the individual who is careful not to spread droplets does not help himself, but only others. He is at the mercy of the careless and ignorant, and therefore his safest recourse is to avoid street cars and pub-

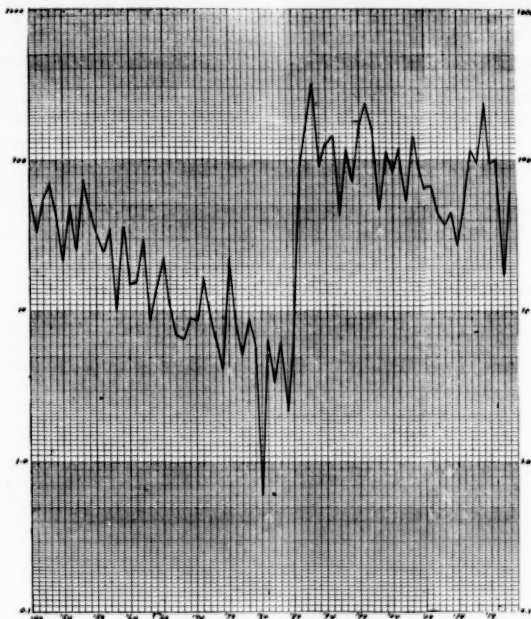


FIGURE 66
INFLUENZA
MASSACHUSETTS, 1849-1922
Specific Age Mortality Rates per 100,000
Age over 60

timate contact during school hours. Schools have never been proven to be of appreciable importance in the dissemination of infection.

Masks accomplished nothing of benefit in 1918. Any measure of this kind which cannot even be enforced among nurses and orderlies in hospital wards cannot be adequately carried out among the general public. Some few would be conscientious but their masks would become filthy bacteriologically, and besides would not protect the conjunctivae.

The only general control method which affords any hope of reward is education of the public, of the medical profession, and of the

lie gatherings where contact with such individuals is closest. Avoidance of insanitary restaurants seems even more important if the work of Lynch and Cumming is significant. The boiling of all dishes after each meal, and the avoidance of any crowding whatever in the home are some of the applications of the principles of personal hygiene which should be urged.

Vaccines have not yet proven successful. A good vaccine producing active immunization would be ideal but the probabilities are that its use would not be wide enough to prevent epidemics, since even vaccination for small pox

is so neglected. A vaccine which would prevent the fatal secondary infections, even if it did not control the disease itself would be of marked value in lessening mortality, for influenza is not a fatal disease.

(To be continued)

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DEDICATION OF THE SECOND HEALTH UNIT FOR THE CITY OF BOSTON

THE second Health Unit erected from the income of the George Robert White fund and located at Paris and Emmons Streets, East Boston, was fittingly dedicated on August 4 in the presence of a distinguished assemblage of physicians, leaders in the social welfare world, and many representative men and women. The key to the building was presented by Mr. Roland W. Boydon, President of the Chamber of Commerce, and one of the trustees of the White Fund, to His Honor, the Mayor, who accepted it with the statement, "that this key in a symbolic sense opens the door to a wide and beneficent endeavor not only to serve the people of East Boston, but as an example set by Boston which is already being followed in other cities in this country and Europe."

A splendid address was delivered by Dr. James Stone, President of the Massachusetts Medical Society, who, speaking for the medical profession, pointed out the many changes which have taken place in the field of medicine and the compelling readjustments which the physicians of today are obliged to make to keep abreast of the demands of the educated laity.

Dr. James Strong, President of the East Boston Medical Society, speaking for the physicians of East Boston, welcomed this institution as a necessary factor in the betterment of health and welfare conditions for the district and promised hearty co-operation of the physicians.

Doctors Mahoney and Wilinsky, speaking for the Health Department, pointed out the ser-

vices carried on at the health units already functioning, and to put into effect in East Boston, and expressed their appreciation of the splendid co-operation which existed in this city among health and welfare agencies, and setting an example that other cities are planning to follow.

Dr. William Augustus Evans, former President of the American Public Health Association, and now Health Editor of the *Chicago Tribune*, delivered the dedicatory address. He pointed out that many cities were watching and studying Boston's development of health centre work and said, "I hope you will bear the thought in mind that in extending your Health Units you are not only serving yourselves and your community but the nation." He emphasized the importance of close relationship between the health officer and the physicians in the district, who must regard it as the individual possessing valuable influence in the home and best able to endorse the policies advanced by the Health Department. We must not forget that the most effective agent of health should be the practitioner of curative medicine, who has been helpful in the past and will be in the future.

Dr. Evans stressed the important value of the centralized health work which brought a personal relationship in a neighborhood between representatives of the Health Department and the people of the district. This makes possible the change of customs and habits advocated by the health educator, who is able, because of the personal relationship, to advance his theories and see them put into effect. This does not work out so well from a central office many miles away, in instances, from the community we desire to educate. In this progressive development the health unit plays a valuable part.

A CAMPAIGN AGAINST THREE COMMUNICABLE DISEASES

DR. S. B. WOODWARD is in receipt of a letter from S. J. Crumaine, General Executive of the American Child Health Association, in which the following announcement is made:

"At the annual conference of State and Provincial Health Authorities of North America at Atlantic City they resolved to make a united campaign against three of our communicable diseases—against diphtheria during September and October, a smallpox campaign during November and December, and a typhoid fever campaign during January and February of next year."

In connection with the smallpox campaign the General Executive has asked Dr. Woodward to write an article on "The Fight for Vaccination Legislation."

We congratulate the Association in the selection of Dr. Woodward for no one is better qualified to deal with this phase of the campaign.

Case Records
of the
Massachusetts General Hospital

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN
WEEKLY CLINICO-PATHOLOGICAL EXERCISES

EDITED BY

RICHARD C. CABOT, M.D., AND HUGH CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 12371

**A CASE CHARACTERIZED BY
GENERALIZED CRAMPS**

MEDICAL DEPARTMENT

A Turkish leather factory operative forty years old entered December 23. The chief complaints were "pains all over",—cramps in the legs, arms, abdomen and back, and pains in the tibiae, all of which had been continuous for two months. The history was given by a friend.

Two months before admission he began to have the cramps and pains which were his chief complaints. There was pain across the lumbar region on respiration, particularly on the right side. His nose and throat were very dry. He had difficulty in swallowing. Two weeks before admission he had a severe sore throat. He was obliged to give up work. He could not sleep on account of the pains, especially those in his legs. For two weeks he had had pain across the frontal sinus region. In the past two weeks he had vomited twice. Once the vomitus was blood streaked. He had had some nausea. He had no appetite and could not eat meat. He had pains beneath the sternum. A week ago he had nosebleed amounting to a small cupful. Soon after this he noticed a tendency to drowsiness. This had increased definitely. His nose had continued to drip blood.

For thirteen years he had worked steadily in a leather factory, boiling the dyes and inhaling their vapors.

The family history was good as far as the patient's slight knowledge of it went. He had gonorrhea at fifteen. While in Turkey, which he left when he was twenty-five, he had "sores" all over his body. Three years ago he had a sore on the penis and was given a course of injections in his arm. For three years his bowels had been constipated, requiring catharsis. A year before admission he had cough for five weeks, once with hemoptysis of a cupful of blood. For nearly a year he had had urination at night and slight frequency by day. The vision of the left eye was poor. For eight months he had been unable to read newspaper print. His habits were good. He denied the use of tobacco, alcohol and drugs.

Examination showed a well nourished man, drowsy but rational and uncomfortable. The skin was dry. The teeth were poor. There was pyorrhea. There was some blood in the nose. The breath smelled like ethylene. The right back showed dullness with no change in breath sounds from midscapula to a point just below the angle of the scapula. There was a suggestion of a friction rub in the right chest below the nipple. The expansion at the right base was less than that on the left. The apex impulse of the heart was felt in the fifth interspace 12 centimeters to the left, 4 centimeters outside the midclavicular line. The right border was 3 centimeters to the right, the supraclavicular dullness 5 centimeters. The aortic second sound and the pulmonic second were both accentuated. There was a systolic murmur at the apex. The radials were thickened. The temporals and brachials were tortuous. The blood pressure was 180/95. The pupils were small, otherwise normal. The knee jerks were hypoactive. The ankle jerks were not obtained. There were scars on the arms (from arsphenamin injections?). On the penis was a scar, not contracted or hard, more like a peck mark than the scar of a chancre. The pupils were small, otherwise normal. The fundi were normal.

The urine was normal in amount, cloudy at one of five examinations, specific gravity 1.006 to 1.012, a trace to the slightest possible trace of albumin in all specimens, including one catheter specimen, leucocytes in all, rare to 5-7 per high power field. The catheter specimen showed 1-3 red blood corpuscles per high power field. One other specimen showed rare red cells. The renal function was zero. The blood showed 7,200 leucocytes, 79 to 73 per cent. polynuclears, hemoglobin 60 to 70 per cent., 3,456,000 to 3,520,000 reds. One smear was normal. A second showed slight anisocytosis and slight increase in the number of platelets. Many of the large mononuclears were vacuolated. Non-protein nitrogen December 24 130 mgm. per 100 c.c., December 31 245. January 2, chlorides 577 mgm. per 100 c.c., phosphorous 7.8 mgm. per 100 c.c. A Wassermann was negative.

The temperature ranged from 96° to 100°, the pulse and respiration 70 to 105 and 13 to 29, with a terminal rise of 131 and 42 respectively.

A South Medical consultant reported, "I see no reason to doubt that the scar on the glans is luetic. For treatment, if the kidneys improve, arsphenamin is of course the drug of choice."

December 27 the patient had more nasal bleeding and passed a small amount of blood by rectum. December 29 12 cubic centimeters of 5 per cent. calcium chloride was given intravenously. The patient vomited, so no more was given. January 1 the stomach was washed with two liters of warm water and 500 cubic centimeters of normal saline containing 20 cubic

centimeters of 5 per cent. calcium chloride was given intravenously.

That afternoon the patient had pain in the right chest, cyanosis, rapid respiration and feeble pulse. There were a few scattered râles in both chests and a friction rub in the right lower lobe which persisted the next day. That day, January 2, he died.

Note by senior house officer, Dr. Read M. Ellsworth. The patient showed marked peripheral sclerosis. In successive urinary examinations there appeared at times a few red blood cells, and at others none in the sediment.

DISCUSSION

BY RICHARD C. CABOT, M.D.

NOTES ON THE HISTORY

1. These complaints mean nothing to me. When pains are as generalized as that it is the "Schmerzen überall" of which we can make nothing. They have to be localized or associated with some particular thing that brings them up, or we have to give it up.

2. We begin to think of trichinosis, but although I cannot rule it out, trichinosis does not usually give exactly the picture that we have so far.

3. They are trying to see whether there is any industrial poisoning.

4. Certainly there was a diagnosis of syphilis in this case, whether correct or not we do not know.

5. Up to the physical examination I am still in the dark. The constant nasal hemorrhage is perhaps the most suggestive thing.

6. A PHYSICIAN: What do you think about "a cupful of blood"?

DR. CABOT: We cannot say it is insignificant. If we were sure he had it we should think of tuberculosis.

7. A PHYSICIAN: With pains in the legs and bleeding from the nose we might think the latter due to a mucous patch. It all points back to lues.

DR. CABOT: I have never seen a mucous patch that bled, and I have never seen nose-bleeding from syphilis. The pains of tabes are not ordinarily so steady as these.

8. A PHYSICIAN: With these pains in the long bones we might suspect a myelogenous leukemia.

DR. CABOT: Yes. I am thinking of the blood diseases; but I think this is probably something that we have not thought of at all.

NOTES ON THE PHYSICAL EXAMINATION

1. I do not know what this ethylene breath means.

2. If it is correct that there is no change in breath sounds we pay no attention to dullness. Possibly there are old pleural adhesions. There

has to be more than a "suggestion" of a friction rub. A friction rub either is or it is not.

3. If these measurements are correct the heart is enlarged. It is three centimeters to the right of midsternum, therefore it is not displaced. We get no information when the sounds are both accentuated.

The blood pressure shows us something.

4. The knee-jerks were sluggish, but that means they were there, not absent. Tabes sometimes gives absent ankle-jerks when the knee-jerks are present.

I have never forgotten making such a mistake when I was in the Out-Patient Department here. The Medical Room was next to the Nerve Room. They had a man who had a five thousand dollar smile. He came in one day with this smile and a patient by the arm. He said, "I think you will be interested in this patient whom you diagnosed as stomach trouble, and who has gastric crises of tabes." I began to feel very small indeed and went to my records to see if I had tried his knee-jerks. I had, and they were all right, so I thought I had ruled out tabes. "Oh, yes, he has good knee-jerks," said Dr. —, "but he has no ankle-jerks. Did you try them?" So one must remember that possibility, especially in a case that has other suggestions of syphilis.

5. The scars on the arms are probably from the arsenphenamin injections.

6. Some syphilographers tell us that true chancre does not leave a scar, and that scars on the penis are not evidence of syphilis, as they have been taken to be in very many textbooks and for so long a time. But they add that syphilis very often goes along with a chancreoid, and chancreoid does leave a scar. In France during the war, where I saw more syphilis than ever before, most of our infections were double, chancreoid infection along with syphilis. If then we have a scar, there may have been syphilis at the same time, but I understand that true chancre does not leave a scar.

7. "Pupils normal" is against tabes—does not rule it out, but is against it.

8. The gravity of the urine was 1.006 to 1.012 as noted in five examinations. Even though they were not doing a fixation test, they ought to have got some gravity above 1.012. If we have taken five different specimens, at various times of day presumably, and they have all been between 1.006 and 1.012, we cannot help suspecting that a fixation test would show fixation of gravity, which is one of the most important and simplest signs of kidney trouble.

9. I have said that we can have low renal function with normal kidneys except for passive congestion. But I always feel uncomfortable in saying that kidneys are normal when the renal function is zero. I think it is conservative to say that there is probably some-

thing wrong with the kidneys when nothing of the red dye that we use comes through.

10. The low red cell count backs up the idea of nephritis unless it is due to hemorrhage of the nose, and then again the hemorrhage itself might be due to nephritis.

11. The non-protein nitrogen is very high.

12. The South Medical Department is our pleasant expression for syphilis. I think it is a very convenient arrangement to have a syphilis department connected with a general hospital.

13. The consultant's report about the scar is contrary to what I have been saying. We have to take it for what we believe. He would not give arsenamin I am sure with the kidneys as they seem to be at the present time.

14. They are suspecting a terminal pneumonia.

DIFFERENTIAL DIAGNOSIS

He died, I think, of chronic nephritis. What is the evidence for this? He comes for generalized pain, which I cannot account for. Nasal hemorrhage is a common symptom of nephritis. When people past middle life come with it, we suspect nephritis and take the blood pressure. There is an enlarged heart and a history of syphilis, which certainly does not make a man less likely to have a vascular type of nephritis. There is an enormously high non-protein nitrogen. I have never seen it so high in any other condition, unless in some of the "surgical" conditions where the kidney is shut off, compressed into atrophy by hydronephrosis or pyonephrosis, a destruction of the kidney tissues by "surgical" lesions. Then finally we have this zero function, more bleeding, then apparently pneumonia, and death.

Dr. Richardson ought to show us small chronic kidneys.—I suppose small. At this age chronic vascular nephritis is commoner than chronic glomerulonephritis. The heart should be hypertrophied and dilated. Otherwise, except for the terminal infection, which I guess is pneumonia, and for passive congestion, which we usually find in these cases, I can think of nothing else.

A PHYSICIAN: How do you account for the cramps? Do you think the dye would have anything to do with them?

DR. CABOT: I think not, because he had the cramps from the very beginning. Those cramps may have been uremic. Sometimes I have thought that cramps were uremic. I do not feel sure about it.

A PHYSICIAN: Could syphilis be the exciting cause of nephritis?

DR. CABOT: We do not know that that is so, but we know that syphilis tends to vascular disease and vascular disease causes one type of nephritis.

A PHYSICIAN: The treatment might have caused it.

DR. CABOT: I do not think we know that treatment for syphilis would cause this type. It would cause the tubular type.

A PHYSICIAN: Will Dr. Richardson find any evidence of syphilis?

DR. CABOT: No, I think Dr. Richardson will say that there is no evidence of syphilis in this body. He might find a little syphilitic aortitis in the latent form without any damage to the valves or angina. Or he might find perihepatitis and perisplenitis, which he does not think a sign of syphilis.

I do not know why this man did not have convulsions. All we can say is that convulsions are not invariable in uremia.

A PHYSICIAN: The hemorrhages may have relieved the situation.

DR. CABOT: That is a good point. I have often seen hemorrhages, spontaneous or artificial, stop convulsions.

A PHYSICIAN: Could not the pain in the right chest be due to pulmonary embolism?

DR. CABOT: Is it sudden enough? It seems as if it might be sudden. It is the same day he died. I do not see how we can rule out pulmonary embolism. General heart weakness is the best we can say. Such a heart is generally weak, and hypertrophied and dilated, and may have had an intercardiac clot. Pneumonia is commoner than embolism, and the signs will do equally well for pneumonia. If they had said he was tremendously cyanosed I should swing over to embolism. That is just a question of how the record is written. It may perfectly well be so.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Chronic nephritis.

Uremia.

Pulmonary infarction.

DR. RICHARD C. CABOT'S DIAGNOSIS

Chronic arteriosclerotic nephritis.

Uremia.

Hypertrophy and dilatation of the heart.

Terminal pneumonia?

ANATOMICAL DIAGNOSIS

1. Primary fatal lesion

Arteriosclerotic nephritis.

2. Secondary or terminal lesions

Slight arteriosclerosis of the aorta and great branches.

Hypertrophy and dilatation of the heart.

Congestion of the lungs.

Acute serofibrinous pleuritis, right.

3. Historical landmarks

Chronic pleuritis.

DR. RICHARDSON: The gastrointestinal tract was frankly negative. There was nothing in the mesenteric and retroperitoneal glands. No syphilitic lesions were found.

DR. CABOT: That is what he always says.

DR. RICHARDSON: In the right pleural cavity there was 1200 cubic centimeters of thin brownish red fluid and fibrin. The pleura on that side was coated with a thin layer of fibrinous material, a frank acute serofibrinous pleuritis, terminal infection. On the left side 300 cubic centimeters of negative fluid and no pleuritis. The trachea and bronchi contained a little frothy fluid and mucus. The bronchial glands were slightly enlarged, somewhat pigmented, but there were no evidences of tuberculosis. The lower lobe of the right lung was collapsed, a compression atelectasis. There were no areas of pneumonia in either lung. There was some congestion.

The heart weighed 495 grams, considerable hypertrophy for him. The myocardium was generally thick, four millimeters on the right, thirteen millimeters on the left. There was slight dilatation on the left, much on the right. The valves were frankly negative except that their circumferences were slightly increased. The coronaries were free but showed a little arteriosclerosis, fibrous in character. All told a hypertrophied and dilated heart with nothing to account for it within the heart and no associated pericarditis. We must look outside.

The kidneys told the whole story:—the combined weight 140 grams,—very small—capsules adherent, gray-brown-red, finely granular surfaced, tough tissue, the cortex where made out about three millimeters, the markings indistinct, the cut ends of the vessels prominent,—chronic nephritis of the arteriosclerotic type.

The aorta showed scattered along it here and there considerable arteriosclerosis, a picture that we commonly find in these cases of arteriosclerotic nephritis,—more or less arteriosclerosis in the aorta and the branches.

The liver showed no definite congestion. The spleen was slightly enlarged, nothing abnormal about it except for the increase in size; possibly the Mediterranean spleen.

Microscopic examination of the myocardium and spleen negative, and of the kidneys showed much arteriosclerosis of the vessels here and there in the sections, with marked atrophy and increase of interstitial tissue.

CASE 12372

OTITIS MEDIA FOLLOWED BY FEVER OF OBSCURE CAUSE

CHILDREN'S MEDICAL DEPARTMENT

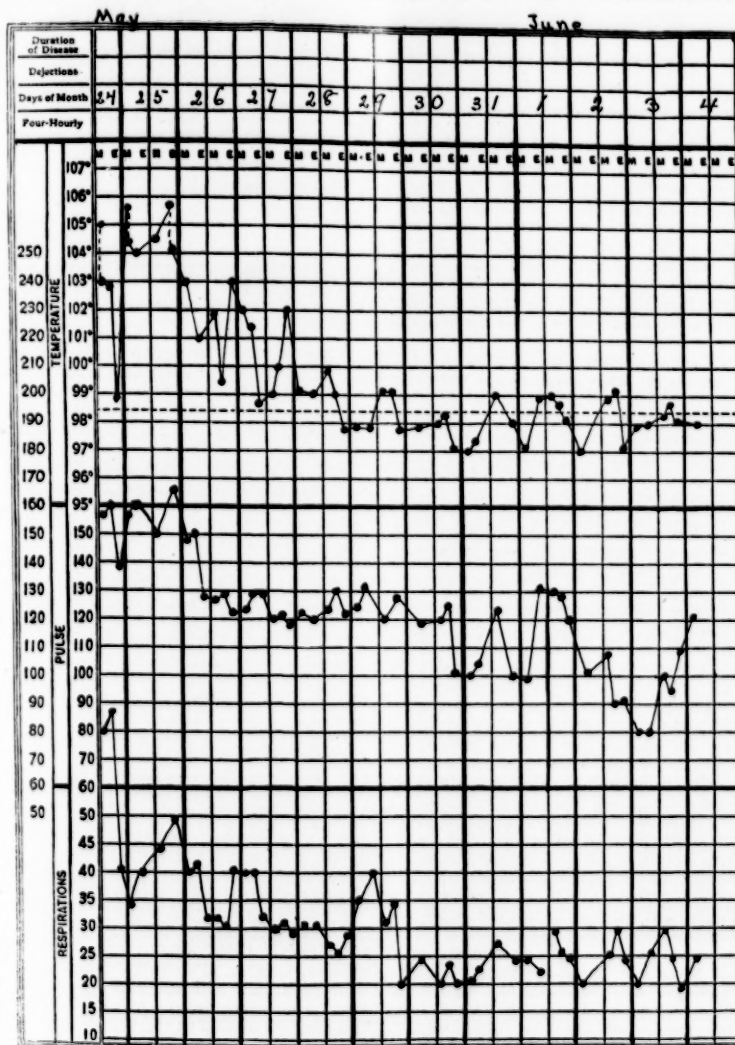
A male child of Italian parentage, age fourteen months, was admitted May 24. The chief complaints were fever and running ears. There

was nothing in the family history or past history of any significance.

The present illness was dated from two weeks before admission, when he awoke in the night with a heavy cold and thereafter was restless. He continued to be fussy and to cough during the next day, although the cough became a little looser from this time onward. There was a marked nasal discharge and a red throat. The fever continued and the child rubbed his ears during the next day or two. He was brought to the Out-Patient Clinic five days after the onset, when the left ear was opened. Two days later he was again brought to the Clinic and the right ear was opened, though neither ear discharged much pus. Six days ago, during the night, he seemed to become sicker, and redness and swelling were noted behind the right ear. The temperature at that time was found to be 104° and he was brought to the Clinic again the next morning. The right ear was again opened. Since that time it had discharged a sticky yellow pus. The left ear, though discharging less, had continued to yield some pus. From the time of the last visit to the Out Patient Department until admission to the hospital the temperature had ranged between 99° and 107°, to which latter height it reached the night before admission, when the child had a convulsive attack which lasted half an hour. After that the child went to sleep, an ice bag having been put on his head. He continued restless throughout the night. He had vomited but once, and had taken water and milk well since the onset of the illness. For the past week it was noted that the urine was dark colored, although there was no blood. With the occasional assistance of castor oil his bowels had moved once or twice a day. The movements were apparently normal in character. Since the beginning of the present illness there had been a loss of three pounds in weight.

On admission to the hospital examination showed a well developed and nourished child, acutely sick. The skin was dry and clear. The mucous membranes were normal in color and appearance. The sclerae were clear. The pupils were equal, regular and reacted normally to light and distance. From both ears was a sticky yellow purulent discharge. The left drum showed redness and some bulging at the lower posterior quadrant. The right drum was also somewhat red and bulging. The throat was injected. The tonsils were somewhat swollen but not very acutely involved. The anterior cervical glands and those in the submaxillary region were slightly enlarged. The nose showed a bilateral discharge. The heart was normal in all respects. At the left base posteriorly there was a slight diminution of resonance, and a few coarse râles were heard over this area; otherwise the breath sounds were perfectly normal in character and no râles were heard. Examina-

tion of the abdomen showed nothing abnormal. The platelets were apparently normal, and the red cells were normal in character. The urine The temperature, pulse and respiration are on the day following admission showed consid-



shown in the chart. On the day of admission the red count was 5,000,000, hemoglobin 90 per cent.; there were 28,400 white cells, of which 80 per cent. were polynuclears, 19 per cent. lymphocytes, and one per cent. mononuclears. erable albumin and a few red cells and white cells but no other abnormalities. Subsequently it became perfectly negative in all respects. The stool was negative. Blood culture on the day of admission was negative. Blood Wassermann was

negative. Throat culture showed streptococcus but no diphtheria bacilli. He did not react to 1:1000 injection of tuberculin intradermally.

DISCUSSION

BY ARTHUR BATES LYON, M.D.

I have chosen this case because it offers an interesting diagnostic problem—one which before it was solved came near leading to a serious mistake.

Upon admission the primary attention was naturally focused upon the ears. There was no question that a still active infection lingered in these organs, and to consider some complication of otitis media would come first in anybody's mind. The marked septic swing of the temperature, reaching at times a very high level, and the convulsion he had just experienced, required that intracranial extension of the aural inflammation be ruled out.

There was to be sure some question of the left lower lobe of the lung, but the signs were by no means outspoken there, and soon after admission the rate of respiration settled down to a level not disproportionate to that of the pulse. This, of course, tended to withdraw attention from the lungs. And besides, there was no dyspnea, nor was the cough striking.

Of the ear complications, those which came to mind with these very acute symptoms were especially mastoiditis and thrombosis of the jugular bulb or of the lateral sinus.

Any marked involvement of the mastoids seemed to be ruled out by X-rays taken shortly after admission. But it was not easy to exclude sinus thrombosis. While sinus thrombosis most often follows mastoiditis, the latter is not necessarily a preliminary. Sinus thrombosis could not be excluded here. There are no trustworthy external signs by which this condition is to be known. The marked swing of the temperature favored it. The white count was compatible. With sinus thrombosis the blood culture is frequently positive. It was negative here—but absence of proof is not proof of absence; not all organisms will grow in all broths.

An ear consultant was as suspicious as the pediatricians of this complication.

For sinus thrombosis there is no relief except by surgery, and too long delays are dangerous. Three days after admission the child was ready for operation, when the signs of solidification in the left lower lobe became strikingly evident. The findings were substantiated by X-ray. With this evidence to the fore the idea of operative interference was of course abandoned. The child continued to improve daily. The ear symptoms gradually cleared, and he made an uneventful recovery.

It may be remarked in conclusion that in children the physical signs of pneumonia are often long in abeyance, and occasionally are not to

be found until almost the time of crisis. One must then be more than usually circumspect about resorting to surgery until that disease can be definitely excluded. In this case the indefinite signs in the chest on admission should have received more attention than they did. Had they been a little longer delayed the child would have gone to operation, not improbably with the most disastrous results.

DIAGNOSIS

Acute suppurative otitis media, double.
Lobar pneumonia.

CASE 12373

HEMATURIA—ALWAYS IMPORTANT

SURGICAL DEPARTMENT

A Scotch dyehouse worker sixty-eight years old came to the Consultation Clinic March 30.

Two years before admission he had retention of urine. After catheterization he had hematuria and urinated five or six times at night and frequently by day. For the three days preceding his visit he had had bleeding and retention. The morning of the visit he was catheterized. He had lost fifteen pounds in six months.

At the Clinic a soft catheter passed easily. A few drams of hazy urine was obtained. Cystoscopy was easily done. No cause for bleeding was seen in the bladder. There was slight bilateral enlargement of the prostate and moderate anterior cleft, but the outline was smooth. The ureters were easily seen and appeared normal. A normal flow of slightly hazy urine was obtained. Renal function test; right, $3\frac{1}{2}$ minutes, left $7\frac{1}{2}$ minutes. The left catheter did not flow well. There was good flow from each side in fifteen minutes, better on the right. Urine clear, acid, a slight trace of albumin, no sugar. Sediment of right kidney urine was loaded with red blood cells and occasional epithelial cells, left the same. Right kidney function 15 per cent., left less than 5 per cent. A pyelogram was taken. Neither kidney shadow was well defined. No shadows suggesting calculi were visible prior to injection. Following bilateral injection the left kidney was seen lower than usual. The calices were normal. There was slight dilatation of the pelvis. Some apparent rotation of the kidney. Right kidney, upper and middle calices not visible. Pelvis dilated and had a mottled appearance with areas of diminished density. The minor calices of this kidney were blunt and dilated. The right ureter was well defined. Slight narrowing at ureteral pelvic junction. Slight dilatation of ureter. On the right lateral aspect of the bladder is a small outpocketing suggesting diverticulum.

April 6 the patient reported another attack of retention and hematuria. Cystoscopy gave

smoky urine. The bladder was as before. The stained jet from the right ureter was not very marked. Both sides were catheterized. Bloody

The left sediment showed many red blood cells. That day the patient was admitted to the wards. No further history is recorded.



Pyelogram March 30. Neither kidney shadow is well defined. No shadows suggesting calculi were visible prior to injection. Following bilateral injection the left kidney was seen lower than usual. The calices were normal. There was slight dilatation of the pelvis. Some apparent rotation of the kidney. Right kidney, upper and middle calices not visible. Pelvis dilated and has a mottled appearance with areas of diminished density. The minor calices of this kidney are blunt and dilated. The right ureter is well defined. Slight narrowing at ureteral pelvic junction. Slight dilatation of ureter. On the right lateral aspect of the bladder is a small outpocketing suggesting diverticulum.

urine was obtained from the right, clear from the left. The left function appearance time was three minutes, function 25 per cent. The right kidney sediment was loaded with red blood cells.

Examination in the wards showed an undernourished elderly man. Over the right kidney there was definite tenderness and some spasm. No mass however could be felt. The heart mea-

surements and location of the apex impulse are not recorded. There was a loud blowing systolic murmur over the precordium, most distinct over the aortic area. No thrill could be made out. There was Corrigan pulse. The artery walls were thickened. The brachials were tortuous. The blood pressure was 200/70. Rectal examination showed the prostate rather soft, not apparently enlarged and not tender. The pupils were normal. The knee-jerks were equal.

Before operation the urine was cloudy, specific gravity 1.012, a slight trace of albumin. Sediment showed many leucocytes and red blood corpuscles. The blood is not recorded. Non-protein nitrogen 32 mgm., uric acid 4 mgm. April 6 renal function appearance time 4 minutes, first hour 50 per cent., second hour 25 per cent.

The temperature was 98.4° to 99.7°, the pulse 68 to 89, the respiration normal.

April 8 operation was done. Next day the patient was in good condition except for some pain over the area of the incision. For the next two days he slept practically all the time. There was considerable bloody drainage from the incision. A medical consultant reported, "Can find no evidence of pneumonia. Heart is typical senile heart. Can be helped by moderate digitalis. a grain and a half four times a day for a day or two. Pack and forced fluids are all I can suggest. Possibly five grains of theosin by rectum might help." By April 13 the patient was semicomatose. No definite cause for the condition could be found. That evening he died.

DISCUSSION

BY EDWARD L. YOUNG, JR., M.D.

Retention of urine at sixty-six means obstructing prostate more often than it means anything else, but very often it means an acute congestion of the prostate from some trivial factor on top of a mild adenomatous condition, so that after a few days of catheterization the patient is able to urinate again as before and is not driven to seek surgical aid at that time. Also the fact that he had hematuria following catheterization under those conditions is not at all unusual.

Cystoscopy does not throw out the prostate as a cause of the original retention and hematuria. It simply tells us that it is moderately enlarged.

The split function can not be taken as an absolute total function as a rule, but only as comparing one kidney with the other. Here the difference between fifteen and five is enough to suggest that there was an actual difference in the function of the two kidneys. The fact that the urine from both kidneys showed blood means nothing at all, because the ureter catheter generally causes trauma enough so that there is blood in the specimen.

The pyelogram shows a definite abnormality of the right side.

The account of the second cystoscopy is a lit-

tle confused, because it gives us a good function for the left kidney but does not tell us what the right was doing in comparison. It does tell us however that there was a stained jet from the right ureter, which is the one way of being sure that there is actual bleeding from that kidney. The total function given on April 6 is entirely normal. The non-protein nitrogen is likewise normal. As I read this case the evidence is still a little confused, although I have no doubt that it is clear enough in the mind of the surgeon. The impression I get is of a right kidney which is bleeding possibly because of an infected hydronephrosis. The possibility of tumor must be borne in mind, although this X-ray is consistent with either. In a man of this age with this blood pressure it would seem to me to be rather necessary to get all the data possible before going to the point of nephrectomy. I should like to have the split function and the pyelogram checked up, and should want to be sure that he could not continue to get on comfortably as he was.

DR. YOUNG'S PRE-OPERATIVE DIAGNOSIS

Infected hydronephrosis?
Hyernerphroma?

X-RAY INTERPRETATION

Appearance of kidney is that of a neoplasm or a large blood clot, quite probably tumor.

PRE-OPERATIVE DIAGNOSIS

Tumor of right kidney.

OPERATION

Ethylene-ether. Median abdominal incision about ten inches long through the right rectus, beginning just below the border of the ribs and carried down to just below the umbilicus. The peritoneum was opened and the ascending colon packed off toward the median line. The posterior peritoneum was opened to the outside of the colon. The kidney was found and delivered into the wound. In freeing the kidney the true capsule was partly stripped off, showing a granular appearing surface. On palpation the kidney appeared perfectly normal except that it was a little larger than usual. As there was no gross evidence of tumor the kidney was completely decapsulated. The wound was closed in layers and drainage made by means of a stab wound through the right loin.

FURTHER DISCUSSION

It is easy to be critical on backward look, but it seems to me that they should have been sure of going in for some necessary condition and then have taken the kidney out in the quickest possible time regardless of its external appearance, because it is true that a hypernephroma

can be present without showing itself on the surface. It seems hardly fair to criticize the operation also, but this approach to the kidney, although it may give good control of the blood supply, likewise subjects the patient to the risk of intra-abdominal sepsis.

There is nothing in his operative story which will give us a line on why he died. Certainly it can not be uremia if we are to take the one red test and the blood chemistry seriously. It is still possible that this is a tumor and that he had metastasis elsewhere.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Hypernephroma, right?

Bronchopneumonia.

Operation, exploration of the right kidney.

DR. EDWARD L. YOUNG'S DIAGNOSIS

Infected hydronephrosis?

Hypernephroma?

Peritonitis?

ANATOMICAL DIAGNOSIS

1. *Primary fatal lesions*

Papillary adenocarcinoma (hypernephroma) of the right kidney.

Pyonephrosis, right.

2. *Secondary or terminal lesions*

General peritonitis.

Cirrhosis of the liver.

Arteriosclerosis.

Hypertrophy and dilatation of the heart.

Slight hypertrophy of the spleen.

3. *Historical landmarks*

Slight chronic pleuritis, left.

DR. RICHARDSON: The head was not examined.

The skin was sallow. The margins of the operation wound were infiltrated with pus.

The peritoneal cavity contained about 400 cubic centimeters of purulent fluid and there was a well marked general peritonitis.

The liver was three centimeters below the costal border. The diaphragm was at the fourth interspace on the right, the fifth on the left.

There were a few old pleural adhesions on the right side.

The heart weighed 426 grams, slightly enlarged. The myocardium, valves, cavities and coronary arteries were negative. The aorta and great branches showed a moderate amount of arteriosclerosis.

The liver weighed 1425 grams and showed frank cirrhosis.

The spleen weighed 230 grams; slightly enlarged. The tissue was dark purplish brown-red and rather elastic.

The left kidney weighed 175 grams and was frankly negative. The right kidney weighed 113 grams. There was a mass in the right kidney to be described which weighed about 60 grams. In the region of the upper pole of the

organ there was a roughly spherical mass about five centimeters in diameter which rounded up beneath the surface and consisted of brownish yellow peripheral portions with central dark reddish and gray-yellow portions infiltrated with blood-like material in places. Microscopic examination of the tumor showed a papillary adenomatous structure. From the mass grayish yellow necrotic somewhat spongy portions extended into the pelvis. This obstructed the ureter to a considerable extent. The upper half of the pelvis was slightly dilated and contained some mucopurulent material. There was some reddening of the mucosa. The remaining portion of the kidney tissue was negative. The ureter below the pelvis was negative.

THE COMMISSION TO INVESTIGATE THE OPERATION OF THE WORKMEN'S COMPENSATION LAW UNDER PROVISION OF CHAPTER 36 OF THE RESOLVE OF 1926

THE Governor has appointed the following named persons to serve on this commission. Charles P. Curtis, Jr., Chairman, Boston Lawyer; Martin T. Joyce, Wollaston, Secretary State Branch American Federation of Labor; Albert White of Taunton, Lawyer and Manufacturer; James Tansey of Fall River; Samuel B. Woodward, Physician and Bank President, Worcester.

The text of the Resolve is as follows:

(Chap. 36)

Resolve Providing for the Appointment of a Special Unpaid Commission to Investigate the Operation of the Workmen's Compensation Law.

Resolved, That the governor, with the advice and consent of the council, is hereby requested to appoint an unpaid commission of five persons, citizens of the commonwealth, one of whom shall be designated as chairman, for the purpose of investigating the effect of the present law relating to workmen's compensation in order to ascertain what defects in said law have arisen since its adoption and what changes, if any, in said law appear to it to be necessary to cure such defects. The commission shall be provided with suitable quarters in the state house or elsewhere, may expend for clerical and other assistance out of such amount, not exceeding twenty-five hundred dollars, as the general court shall appropriate, such sums as the governor and council approve, and shall report the result of its investigations and its recommendations, if any, with drafts of legislation embodying any such recommendations, to the general court by filing the same with the clerk of the house of representatives not later than December first of the current year.

Approved April 28, 1926.

The commission is invested with power to make all necessary recommendations which may improve the operation of the Workmen's Compensation Law.

Many physicians have from time to time criticized certain features of the law and between this time and the filing of the report all objections should be filed with the commission.

The first hearing will be held at the State House, Sept. 21, at 10:30 a. m.

THE BOSTON Medical and Surgical Journal

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Communications should be addressed to The Boston Medical and Surgical Journal, 126 Massachusetts Ave., Boston, Mass.

ROBBING SCARLET FEVER OF ITS TERRORS

SCARLET FEVER ANTITOXIN has proved its worth. A good preparation, given early and in sufficient dosage, produces a change for the better in the scarlet fever patient that is little short of miraculous. The temperature falls rapidly, the rash fades, the toxic symptoms abate and the sufferer quickly recovers his sense of well being. Convalescence is rapid, and usually there is an absence of the septic complications that have made the disease rightfully dreaded. Given in the later stages of the disease the antitoxin is less curative. To be sure, it may lessen the intoxication, but it has little or no influence on septic affections already started.

The rule, then, is to give a full dose just as soon as the diagnosis is made, and to give it to every case of scarlet fever with any definite toxic symptoms. Blake advises as a minimum dose—that is, the dose for a mild case in a child—enough antitoxin to neutralize at least 750,000 skin test doses of standard test toxin. The neutralizing potency of the commercial preparations is stated on the label of the container, the potency of one cubic centimeter usually be-

ing given. The scarlet fever antitoxin manufactured and supplied by the Massachusetts Department of Public Health is bottled in vials labelled "One Minimum Therapeutic Dose" and each vial contains enough antitoxin to neutralize about 800,000 skin test doses of toxin, or somewhat more than the minimum amount recommended by Blake.

In the severer cases, two or three minimum therapeutic doses, depending upon the severity of the attack, should be given at one time. The antitoxin should be injected intramuscularly, with, of course, the precautions usually recommended in the administration of other serums or antitoxins.

Scarlet fever antitoxin (officially called "Scarlet Fever Streptococcus Antitoxin") is now prepared by the leading manufacturing biologic laboratories and it can be purchased from their local distributors and in pharmacies. Massachusetts' physicians, however, can obtain this antitoxin for their patients free of charge by applying to the State Department of Public Health, either at the State House or at the Antitoxin and Vaccine Laboratory.

The use of this antitoxin for prophylactic purposes, that is for temporarily immunizing persons who have been exposed to scarlet fever, does not seem desirable, except in those instances where those so exposed can not conveniently be seen regularly, and when the disease might develop rapidly to a serious stage before a physician could attend or antitoxin be given. With the warning given by the knowledge of a recent exposure, with a watchful eye for the appearance of any suspicious symptoms, and with prompt administration of antitoxin when scarlatina declares itself, the disease can gain no dangerous headway, and the patient will have the advantage of the stimulus to an active immunity coming from the slight infection. By giving this new curative agent to every early case of scarlet fever coming under their care, physicians can rob the disease of its most dangerous and destructive effects. Its bill of mortality should be cut to the few deaths that always follow delay.

THE REPORTING OF TUBERCULOSIS DIAGNOSED BY THE ABRAMS METHOD

It is the belief of the Editors of this JOURNAL that one of its functions should be to give publicity to irregularities occurring in the practice of medicine in New England. For this reason the letter from Dr. John B. Hawes, 2nd, is published in this issue. For a thorough understanding of the situation, one should read the letter in question. The situation, put briefly, is this: A woman complaining of cough went to the office of Dr. Francis A. Cave, and in his absence was seen by Dr. Frederick Dugdale. Both these men are still practising the electronic method of Abrams. The examination by the

above method of a few drops of blood from this patient's ear gave the diagnosis of tuberculosis of the larynx and both lungs, and cancer of the stomach. The patient was reported to the local Board of Health as a case of active tuberculosis and was put under the supervision of the Board of Health nurse.

About three weeks later the patient called upon Dr. Hawes for examination. He, after consultation with a radiologist and laryngologist, felt so strongly that there was no evidence of tuberculosis that he wrote Dr. Mahoney of the Board of Health, asking that the patient's name be removed from the list of tuberculous cases. Dr. Mahoney wrote that he would do so if Dr. Dugdale would change or withdraw his diagnosis. As Dr. Dugdale refused to answer Dr. Hawes' letter, Dr. Hawes again wrote Dr. Mahoney, and repeated his request. Thereupon Dr. Mahoney removed the patient's name from his files and from those of the Boston Sanatorium.

It is quite evident that there is something wrong in this situation, but it is not so easy to determine where the weakness lies. The situation must be analyzed rather carefully before one can attempt to suggest remedies to prevent a similar occurrence.

Apparently the Board of Health takes the position that all doctors licensed by the Board of Registration are competent to make a diagnosis of tuberculosis. Drs. Cave and Dugdale are licensed practitioners; therefore their diagnosis, so long as it was unquestioned, was accepted. Should this be so? We believe not. When cases of acute exanthemata are reported, the diagnosis may be questioned by the Board of Health, who may send a qualified specialist to examine the patient. It would seem that in regard to tuberculosis, the Board of Health should at least ask by what tests the diagnosis has been made.

In this case Dr. Mahoney acted properly in accepting the opinion of Dr. Hawes and erasing the patient's name from the lists of those afflicted with tuberculosis.

Nor is the only weak link in the chain that one within the jurisdiction of the Board of Health. We believe that the so-called practice of medicine by the Abrams method is arrant quackery and that those employing this method should be enjoined from the use thereof. In the case in question, the Board of Registration may presumably secure the letter written by Dr. Dugdale, stating that the diagnosis of tuberculosis of larynx and both lungs, and cancer of the stomach, was arrived at *by the electronic method*. The significance of this statement is somewhat diminished by Dr. Dugdale's statement that "physical examination confirmed the diagnosis of tuberculosis of the lungs," but the fact remains that he admits having first made the diagnosis by the electronic method, and he

did treat the patient five or six times by electronic therapy.

He cannot be censured for a mistaken diagnosis, but he should be enjoined from employing a method such as Abrams', which has been demonstrated to be without scientific foundation. This duty belongs to the Board of Registration.

After due consideration of the facts outlined in Dr. Hawes' letter, the JOURNAL maintains that two reforms are needed. First, the Board of Registration should put a stop to the employment of the electronic method by men whom it has licensed as qualified to practice medicine. Second, the Board of Health should ask by what test the diagnosis of tuberculosis is made, before placing an individual upon the precautions which must be followed by sufferers from that disease.

THIS WEEK'S ISSUE

CONTAINS articles by the following authors:

O'HARA, DWIGHT. B.S.; M.D. Harvard Medical School 1919. Visiting physician Waltham Hospital. Junior visiting physician Boston City Hospital. Lecturer on Therapeutics Boston University School of Medicine. His subject is: "Recent Progress in the Prevention and Treatment of Scarlatina, Measles and Diphtheria." Page 561. Address: 751 Main St., Waltham, Mass.

HAWES, JOHN B., 2ND. A.B.; M.D. Harvard Medical School 1903. President Boston Tuberculosis Association. His subject is "Rehabilitation in Tuberculosis." Page 567. Address: 11 Marlborough St., Boston, Massachusetts.

CLIFFORD, RANDALL. A.B.; M.D. Harvard Medical School 1917. Director Pulmonary Clinic and Physician to out-patients Massachusetts General Hospital; visiting physician Channing Home. His subject is "Hilum Tuberculosis." Page 571. Address: 475 Commonwealth Ave., Boston, Mass.

JOESS, MARK H. M.D. Tufts College Medical School 1920. Member National Tuberculosis Association; Assistant physician at the Rutland State Sanatorium. He writes on "Rehabilitation of the Tuberculous with Special Reference to the Employment of Discharged Patients at the Rutland State Sanatorium." Page 575. Address: Rutland State Sanatorium, Rutland, Mass.

RITCHIE, JOHN. Early scientific and engineering training. Member Boston Scientific Society and Boston Society of Natural History. Health commissioner of Boston under Mayor Hibbard. Has made health administration a major activity. Associate Editor of the *American Journal of Public Health*. Member of

Massachusetts Tuberculosis League and Boston Tuberculosis Association. His subject is "Anti-Tuberculosis Work of Today." Page 579. Address: 115 Washington St., Malden, Mass.

HUBER, EDWARD G. Detailed record on page 291, No. 6, Vol. 195. His article is a continued account of "The Control of Communicable Diseases in Massachusetts." Page 583. Address: The War Department, Washington, D. C.

MISCELLANY

LETTER OF DR. JOHN B. HAWES, 2ND, WHICH IS THE BASIS OF THE EDITORIAL ON PAGE 600

June 28, 1926, patient, E. L. L. of Boston, came to see me of her own accord with reference to her lungs. She was single, aged 32, and a bookkeeper. Her father died of tuberculosis in October, 1925, which was one reason for her seeing me. Rest of her family were perfectly well.

Aside from the ordinary children's diseases she was a strong and robust woman at her maximum weight at the present time. Had had five operations on tonsils and adenoids since early infancy, the last one six years ago. She had had gastric ulcers with hemorrhages without operation and was operated on for appendicitis in 1918.

Thanksgiving, 1925, she caught a cold which was followed by a cough which hung on ever since. In February, 1926, she had a mild attack of influenza with a bad sore throat which made her cough worse. In March she went to New Hampshire for a 10 days' stay in bed, where she improved considerably, but after her return to work the cough returned as bad as ever. She raised no sputum, never raised any blood, no fever, pain, eats well and sleeps fairly well, tires easily. Were it not for this cough and the fact that her father died of tuberculosis she would feel perfectly well. An x-ray of her chest taken by Dr. L. B. Morrison, 370 Marlborough Street, Boston, in March, showed no evidence of tuberculosis.

Physical examination showed a strong and healthy looking woman, well developed, of good color. Temperature 98.6, pulse 75, weight 131½, hemoglobin 90%, blood pressure 140/90. Teeth were in good repair, throat was much scarred from various operations, evidently some tonsillar tissue still left.

Heart: normal.

Lungs: showed no abnormality except moderately harsh, prolonged breathing all over.

Rest of physical examination negative.

Her temperature, taken four times a day at home under normal conditions, was perfectly normal; the pulse averaged 60. The urine showed the very slightest possible trace of albumin by heat, no sugar; no sputum submitted.

The x-ray of her chest by Dr. Morrison, August 10, is as follows: "The diaphragm is smooth and rounded. The heart is apparently normal. The chest shows some hilus fibrosis. There are a few glands but nothing remarkable. The outer lung fields are clear and the apices seem clear. The picture is more of a chronic irritation, moderate in amount, not tuberculosis."

I saw her again on July 2 and again found nothing wrong with her heart and practically nothing wrong with her lungs. I advised her to drink 8-10 glasses of water, gave her some capsules of gononol and told her that she did not have any signs of tuberculosis of the lungs. She was seen in consultation by Dr.

Charles O. Day, 270 Commonwealth Avenue, Boston, who reported as follows:

"The nasal septum was straight except for a spur low down on the left. The nasal mucous membrane was clean, the nose not obstructed and the sinuses very clear on trans-illumination. The ears, nasopharynx and larynx were normal. Most of the lower two-thirds of the right tonsil was still in situ in spite, as she states, of five operations on her tonsils. This was definitely infected, contained a number of crypts and the glands on that side were enlarged. The lateral pharyngeal bands were somewhat swollen. I think there is no question but what she should have this piece of tonsil removed and the lateral bands curetted."

I told her that she should have an operation sooner or later but not at the present time.

On my second examination this patient told me that about June 7 she went to the office of Dr. Francis A. Cave and was informed that Dr. Cave was ill and in Florida and Dr. Frederick Dugdale, 376 Boylston Street, Boston, was taking care of his patients. Dr. Cave and Dr. Dugdale have obtained more or less publicity as disciples of Dr. Abrams' electronic method of diagnosis and treatment and at the present time are dealing in the so-called Koch's cancer antitoxin. This patient wrote me in regard to her experiences with Dr. Dugdale as follows: "Dr. Dugdale saw me, took down my life and family history. Then a Mrs. Jones, who works for Dr. Cave, took three smears of blood from my left ear. I was told to return when they received a report of the blood-test and Dr. Dugdale would not make an examination until he received the blood-test report. The following Friday Mrs. Jones called me by telephone to go in. Dr. Dugdale told me I had tuberculosis of the lungs and throat (larynx). He examined my chest and back with the stethoscope, looked at my throat, had me stand still with my eyes closed, sit down on a stool with my legs crossed and knocked each knee. He told me I could be cured and to come in for treatment. I had five, probably six, treatments. In the meantime I asked Dr. Dugdale to write to Dr. E. M. Miller, Woodsville, N. H., his diagnosis of my case which he did. I have not seen the letter he wrote to Dr. Miller but Dr. Miller wrote immediately to me and told me about receiving a letter from a Dr. Dugdale saying that I had about every disease going I guess and to give up the treatments right away and go to a good lung and chest doctor. On the next Saturday the Board of Health nurse was here but I did not see her as I was at the office. Mother told her I was going to see you. I have written to Dr. Miller to send a copy of the letter Dr. Dugdale wrote to him if he still has it. Dr. Miller wrote to Dr. Dugdale telling him that he was interested in my welfare as being a near relative and as man to man to tell him when and where both he and Dr. Cave graduated and that unless he had a reply from him he would not advise Miss — to go for treatment, etc. Dr. Miller never received an answer."

This letter speaks for itself. Dr. Dugdale had apparently reported this case as one of tuberculosis as on July 6 I wrote to Dr. Francis X. Mahoney who informed me that this patient had been so reported by Dr. Dugdale. Dr. Mahoney wrote that if I would get in touch with Dr. Dugdale and have him withdraw his diagnosis or change it he would remove the name from his files and furthermore see that it was removed from the files of the Boston Sanatorium. I accordingly wrote to Dr. Dugdale on July 15. I heard no word from him nor have I ever heard from him although my secretary called up his office various times asking for a reply. He finally told her that he would reply to my letter when he got good and ready.

I then wrote to Dr. E. M. Miller of Woodsville, N. H., a cousin of this patient's mother and a friend

of the family, and he sent me a copy of the letter Dr. Dugdale wrote to him concerning this patient. This letter is as follows:

"On June 9 Miss — called to consult Dr. Francis A. Cave, who is now in Florida, recovering from a severe illness and who is expected home about July 1. During his absence I am taking care of his practice. She was, therefore, referred to me. Her blood was taken for examination by the Abrams' electronic method, which resulted in the following findings: Tuberculosis of the larynx and both lungs and cancer of the stomach, a result of a gastric ulcer. The physical examination this morning confirms the blood findings of tuberculosis of the lungs. I did not, however, examine the larynx with the laryngoscope. Though the abdomen is sensitive at various points, there is no palpable mass to be found on percussion. In approximately 30% of the cases, even in advanced stages of cancer and even though the x-ray findings are positive, we are unable to palpate any mass. I have advised Miss — to visit Dr. Cave's office daily for electronic treatment until his return, at which time should medical treatment in addition to the electronic treatment be deemed advisable, I will confer with him regarding same. At Miss — request I am mailing you my findings in this case."

I then wrote to Dr. Mahoney as follows: "I am hereby definitely requesting that you take the name of — off the list of the Board of Health, Boston Sanatorium Department, as a consumptive. She was reported to you, I believe, by Dr. Frederick Dugdale and the diagnosis was based on the examination of the blood by the Abrams' electronic method. I have a copy of his letter to Dr. E. M. Miller of Woodsville, N. H., family physician of this girl although he naturally did not send her to him. According to this remarkable method of diagnosis this young lady has 'tuberculosis of the larynx and both lungs and cancer of the stomach, a result of a gastric ulcer.'

"If it comes to my opinion that this woman does not have tuberculosis in any form whatsoever versus that of Dr. Dugdale and Dr. Cave, I trust that my own ideas on the subject will prevail. My opinion is based on temperature and pulse observations four times a day for four days which were absolutely normal, an x-ray of the chest which, in my opinion, shows no evidence of any clinical tuberculosis in the slightest, and a consultation with Dr. Charles O. Day, of 270 Commonwealth Avenue, who does all my nose and throat work, who found nothing wrong in the way of tuberculosis of the larynx.

"I am quite unwilling to have this stigma of tuberculosis rest on Miss — and trust that her name will be taken off of your list. I have written Dr. Dugdale and telephoned him various times as to what he bases his diagnosis on and he has so far refused to pay any attention to my letter. I intend to take this case up with the Board of Registration in Medicine and will probably publish the details in the *Boston Medical and Surgical Journal*."

I received the following reply from Dr. Mahoney: "In accordance with your request I have withdrawn this case, previously reported as pulmonary tuberculosis by Dr. Frederick Dugdale, from our records. We have also notified the State Department of Health and the Out-Patient Department of the Boston Sanatorium that this is not a case of tuberculosis and have instructed them to take this name out of their files."

The last letter in this case is one to Dr. Dugdale dated August 4 as follows: "At my request Dr. Mahoney, Health Commissioner, has taken the name of — off his list, that of the State Department of Health, and that of the Boston Sanatorium as one of tuberculosis. I still hope, however, that you

will have the courage of your convictions to let me know frankly on what clinical evidence you have based your diagnosis of tuberculosis. Of course, neither I nor any other physician of intelligence will pay the slightest attention to any diagnosis based on the Abrams' electronic method. In your letter to Dr. Miller of Woodsville, N. H., a copy of which I have, you state that your diagnosis was made on evidence provided by the Abrams' method and that the clinical signs confirmed this although you did not make an examination of her throat. She has been seen by one of the best throat specialists in Boston and her throat found entirely negative as far as tuberculosis is concerned and in my opinion her lungs are equally so. I await your reply with interest." This has elicited no reply.

This whole case is of distinct interest not only from the patient's point of view where manifestly a wrong diagnosis had been made and wrong treatment instituted and the patient done a grave injustice thereby but also in that it brings up the question as to when a patient should be reported as one of pulmonary tuberculosis and such a diagnosis received at its face value by the city authorities. In this case, knowing Dr. Mahoney, it was a comparatively easy matter to get her name removed from the files but, in my opinion, in many other instances this is an extremely difficult thing to do and as long as the name remains on the files as one of tuberculosis it is bound to cause much unhappiness and annoyance to the patient and the patient's family. In a paper which I read some years ago before the Association of Massachusetts Boards of Health I stated my position definitely that all cases of tuberculosis where there was a positive sputum must be reported but that in cases where there was not a positive sputum and where there was a possibility of doubt a physician could not be held liable if he failed to make a report although I personally was of the opinion that a provisional report at least in such cases should be made. I was upheld in my opinion in this matter by Dr. Mahoney and other members of the Association. Concerning the ethics involved, in that Dr. Cave and Dr. Dugdale are practicing a form of medicine, namely the Abrams' electronic method of diagnosis and treatment, which has been demonstrated to be a fraud to the satisfaction of the medical profession in this country, there can be only one opinion.

JOHN B. HAWES, 2ND, M.D.

REPORTS AND NOTICES OF MEETINGS

AMERICAN CLIMATOLOGICAL AND CLINICAL ASSOCIATION

FORTY-THIRD ANNUAL MEETING, 1926

THE headquarters of the Association will be at the Hotel Bellevue-Stratford, Philadelphia. Council Meeting will be held at the Hotel Bellevue-Stratford, Sunday evening, September 26, at 8:30 p. m.

FIRST DAY, SEPTEMBER 27

Scientific Session, 10:00 a. m. to 12:30 p. m. Bellevue-Stratford.

Business Session, 12:30 p. m.

Luncheon at (probably) County Medical Society's new home, Twenty-first and Spruce Streets.

Scientific Session, 2:30 to 5:00 p. m. Hotel Bellevue-Stratford.

Adjourn, 5:00 p. m.

SECOND DAY, SEPTEMBER 28

Scientific Session, 9:00 a. m. (promptly). Bellevue-Stratford.

Business Session—Election of officers and new members, 12 m.

Luncheon Recess. Given by the Philadelphia Health Council and Tuberculosis Committee on lawn of home of Dr. Charles J. Hatfield, adjoining the Chestnut Hill Home for Consumptives. Transportation to home and club house.

Scientific Session. Subject, Heliotherapy. At Chestnut Hill Home for Consumptives.

7:00 p. m. Annual Dinner at Wissahiccon Farms Club House.

PROGRAM OF SCIENTIFIC SESSIONS

NOTE:—Names of non-members who are to be present are in italics.

MONDAY, SEPTEMBER 27, 1926, 10:00 A. M.

Hotel Bellevue-Stratford, Philadelphia, Pa.

President's Address. David R. Lyman, Wallingford, Conn.

Memorial Notices.

1. The Effects on the Heart of Abdominal Operations in Women. Dr. Robert H. Babcock, Chicago.

2. Effect of Pregnancy and Labor on the Presumably Normal Heart. Dr. Walter B. Mount, Montclair.

3. Practical Cardiology. Dr. Glentworth R. Butler, Brooklyn.

4. Syphilis of the Lung with report of a case. Dr. Roy D. Adams, Washington.

5. Clinical Co-existence of Syphilis and Pulmonary Tuberculosis in 659 Cases, with 125 Autopsies. Dr. Charles C. Habliston, Baltimore; Dr. W. Oliver McLane, Jr., Baltimore.

6. Acute Yellow Atrophy of the Liver—case report. Dr. Thomas Darlington, New York.

Business Meeting, 12:30 p. m.

Luncheon Recess.

MONDAY, SEPTEMBER 27, 1926, 2:30 P. M.

Hotel Bellevue-Stratford

7. Some Relations of Vitiating Air and of Inadequate Feeding to Experimental Tuberculosis. Dr. Henry Sewall, Denver.

8. A Discussion of Four Years' Experience in the Treatment of 250 Children with Cardiac Damage. Dr. W. D. Stroud, Philadelphia.

9. Is Chronic Arthritis Always Infectious? Dr. Russell L. Cecil, New York.

10. The Clinical Significance of the Chloride Metabolism in Lobar Pneumonia. Dr. Russell L. Haden, Kansas City.

11. Analysis of Diagnostic Methods in 100 Consecutive Office Cases. Dr. R. R. Snowden, Pittsburgh.

12. Practical Preventative Medicine. Do we practice it? Dr. E. J. G. Beardsley, Philadelphia.

TUESDAY, SEPTEMBER 28, 1926, 9:00 A. M.

Hotel Bellevue-Stratford

13. Interesting Results Observed in Six Years of Clinical Research on Epilepsy. Dr. H. Rawle Geyelin, New York.

14. Title to be announced. Dr. A. R. Dochow, New York.

15. Clinical Aspects of Congenital Anomalies of the Aorta. Dr. John T. King, Jr., Baltimore.

16. Bronchograms in Chest Diagnosis. Dr. James A. Miller, New York, and Dr. Edward P. Eglee.

17. An Analysis of Cases of Endemic Encephalitis. Dr. Thomas P. Sprunt, Baltimore.

18. The Diameter of Red Blood Corpuscles in Pernicious Anemia During Relapses and in Marked Remissions Enhanced by a Special Diet. Dr. George R. Minot, Boston.

19. Title to be announced. Dr. Will Howard Swan, Colorado Springs.

12 m. Annual Meeting and Election of Officers.

Transportation to home of Dr. Hatfield. Luncheon given by Philadelphia Health Council and Tuberculosis Committee.

TUESDAY, SEPTEMBER 28, 1926, 2:30 P. M.

At Chestnut Hill Home for Consumptives—Symposium on Heliotherapy.

20. Clinical Application of Heliotherapy. Dr. Jeremiah Metzger, Silver City, N. M.

21. The Physics of Heliotherapy—Its Possibilities and Obstacles. Professor William T. Bovie, Cambridge, Mass.

22. The Value of Light Treatment in Surgical Tuberculosis. Sir Henry Gauvain, Superintendent Lord Mayor Theloe Cripples' Hospital and College, Alton, England.

Discussion opened by Dr. David T. Stewart, Ninette, Manitoba.

Annual Dinner at 7:30 p. m. Wissahiccon Farms Club House. Transportation from Chestnut Hill will be furnished.

WEDNESDAY, SEPTEMBER 29, 1926

Sesqui-Centennial

A fitting entertainment will be arranged for the members.

For further particulars apply to Arthur K. Stone, M.D., Secretary, Framingham, Mass.